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THE CAVALRY AT CHANCELLORSVILLE, MAY, 1863.

AT a dinner of the Sons of the Revolution, given at New York the past winter, JAMES E. TUCKER who, in 1863, was color bearer of the Second Virginia Cavalry, a regiment in FITZHUGH LEE's brigade, and Colonel FLOYD CLARKSON, who had been a major in the Sixth New York Cavalry, had the pleasure of meeting one another. On the 30th of April, 1863, the latter regiment was surrounded by General LEE's brigade, but, though outnumbered by a force treble his own, the gallant Lieutenant-Colonel McVICAR, who was in command of the Sixth New York, ordered a charge with sabers, and the greater number of those with him reached the main army at Chancellorsville, leaving only dead and wounded behind; among the former the brave McVICAR, who, had his life been spared, would have made his record high among the dashing leaders of the Union cavalry.

Colonel CLARKSON was not with the regiment at the time. Mr. TUCKER, whose horse was shot under him in the engagement, was anxious to meet those who had participated in it, and Colonel CLARKSON invited those who could be reached, to meet Mr. TUCKER at his house, to talk over this and other engagements in which these two regiments had met each other, for the "Old Sixth" was well known to all the Confederate cavalry serving in Virginia; each having the

C. C. C. Carr.

Editor.

respect for the other that brave men feel towards those they meet in battle where true manhood is shown.

It so happened that a short time before this, the writer was told, that living in the same suburb of New York with him, was a Confederate officer, who had been in this engagement with the Sixth New York, and received a saber cut that nearly severed his nose from his face; and thought that his fellow townsman had been the offending party. And on my meeting Captain BENJAMIN F. MEDINA of the Fifth Virginia Cavalry, it proved to be so. How strange it seemed, that after a lapse of more than twenty-seven years, he should tell me in my own home, how in that wild charge in the woods of Virginia, at night, the officer that gave him that "right cut" was shot by Captain REUBEN BOSTON of his regiment, almost at the same moment, and how Captain BOSTON was killed at the last fight of the war, near Appomattox. As he told his story it seemed there could be no mistake in his conclusion; for, as I was engaged with one on the right, before I could turn my horse to give the "left cut" to one who had a pistol that I could feel pressed against me, he fired, the ball going through my left arm and making a wound in my stomach; at the same time a blow on the head knocked me from my horse, and I was left behind to be taken to Libby Prison.

Captain MEDINA participated with us in the reunion of the "Blue and Gray," and the reminiscences awakened then, have prompted me to write of this and other work done by the cavalry at Chancellorsville; however, before leaving the subject of this little gathering, where so much good feeling was shown between those who had often met in deadly strife, let me mention how we called to mind that as General LEE stopped at the little log house where we were, the next morning, and learning that the body of the gallant leader of the little band, which had driven back his whole brigade, lay unburied on the field of battle, he had it brought in, a coffin made from the material that could be had, and buried it there, whence, we afterward had it removed to its final resting place in Rochester, New York. Such kindly feelings existing, with the loyalty expressed for the Union by those who once had fought against it, made all feel that sectional animosity would not have continued long had the men who did the fighting had the readjustment of affairs when the South laid down her arms.

A newspaper correspondent once being asked why so little mention was made of the work done by the cavalry in our Civil War, tersely replied, "that they were generally so far to the front, and so near the enemy that it was rather dangerous and—— unpleasant to

be with them." And this was the case at Chancellorsville. The reports of that engagement written since the war, give but little attention to the work done by the cavalry at that time.

General HOOKER, who was then commanding the Army of the Potomac, says: "The cavalry under General PLEASANTON saved the army from annihilation." Upon entering the Chancellorsville campaign, General HOOKER detached the cavalry, with the exception of the brigade commanded by General PLEASANTON, and sent them under command of General STONEMAN to make a raid on the enemy's line of communication. This command accomplished nothing. There were left with PLEASANTON the Sixth New York, Eighth and Seventeenth Pennsylvania regiments of cavalry, with PENNINGTON's regular and MARTIN's volunteer batteries. As STONEMAN's column moved out leaving us behind, we felt how unjust had been the detail that kept us from sharing in what all thought would bring so much glory to those who should ride with them; but the work done by our little brigade was the commencement of what gave our cavalry the name which has been unequalled by that of the cavalry of any other country.

In the advance to Chancellorsville I will follow only that part of my own regiment that led the advance of the Twelfth Corps under General SLOCUM, which was the right wing of the army; the Eighth Pennsylvania leading the advance of General MEADE's column and the Seventeenth Pennsylvania doing the same duty for General HOWARD, the remainder of the Sixth New York being assigned to other divisions, but joining the cavalry command before the battle was over.

On Wednesday morning about two hundred of the Sixth New York, under command of Lieutenant-Colonel McVICAR, were ordered to report to General SLOCUM; we crossed the Rappahannock river at Kelley's Ford, and soon after were engaged with a North Carolina cavalry regiment, driving them and taking some prisoners, among them a captain, whose lieutenant commanded the guard that a few days later escorted me to Richmond. The lieutenant remarked when he found out that it was the same command that had captured his captain "that the captain was in the habit of being taken without much trouble."

We skirmished all that day with cavalry in our front, reaching Germania Ford on the Rapidan late in the afternoon, a heavy force in rifle pits on the other side preventing our crossing. We took possession of an old mill on the banks of the river, exchanging shots with them until the infantry came up, and a battery put in position shelled the rifle pits, while the infantry crossed and captured all the defenders of the works. Crossing the ford we again

took the advance, capturing some prisoners and baggage of the famous Black Horse Cavalry. We reached the Chancellorsville House Thursday afternoon, having been engaged more or less all the time since we started, with a loss of three men killed, one officer and five men wounded. Having reported our arrival to General SLOCUM, who was about three miles back, orders were received from him to go to Spotsylvania Court House. Colonel McVICAR knew full well from prisoners captured that the force we had skirmished with since crossing Kelly's Ford was vastly superior to ours, and that our advance, so far from support, would be attended with great risk, but as he told the officers with him what we were expected to do, he ordered the bugler to sound "Forward."

"His not to make reply,
His not to reason why,
His but to do and die."

As we marched on a few of the enemy were seen, but they fell back as we advanced; about dark, after marching through the woods, we reached a small clearing; the order to halt and dismount was given; a mounted guard was thrown out to the rear, and Captain BELL, with a few men, was sent towards the Court House. The men had been on almost continuous duty for forty-eight hours, and as they rested, holding their horses' bridles, most of them were lying asleep by the roadside. Captain BELL soon returned and reported that there was a heavy force at the Court House; about the same time the rear guard was fired upon and driven in. The command sprang to their feet, and mounting, very soon formed in line in the open field. It was now very dark, and there was some fear that some of our own troops had come up and, by mistake, had fired upon the rear guard. Colonel McVICAR sent Captain GOLER back to ascertain the true state of affairs. Going back to the junction of the roads to Todd's Tavern and the Chancellorsville House, he was challenged, and on answering, "The Sixth New York Cavalry," was fired upon and driven back to the main body. Sergeant CARROLL was killed by the volley. As the enemy came down the road, which was only wide enough for a column of fours, our men formed in line, fired upon them and checked their further advance. Then Colonel McVICAR ordered the command to draw saber, break by fours to the right, and cut our way through. As our bugle sounded the charge, it was at the same moment sounded by the Fifth Virginia, and the notes rang out clear and full in defiance of each other, as we rode down to where they waited for us. In the darkness it seemed as though a sheet of fire belched forth from their carbines, and at this first fire

the brave McVICAR fell, and the rest of the command were mixed up with the Confederates as we rode through them. Besides Colonel McVICAR, who was killed, three officers were wounded and about twenty men killed and wounded. These were left behind, and the survivors drove the enemy until the cross-roads were reached, where the Confederates took the one to Todd's Tavern, and our men went on to our own lines at Chancellorsville. The wounded were taken to a house near where they fell, and after a few days were sent to Libby Prison.

I copy extracts from an article written for *Blackwood's Magazine*, published in 1866, at Edinburgh, by Major HEROS VON BORCKE, who was chief of staff to General J. E. B. STUART at the time of the engagement, and received a bullet through his hat and had his horse shot through the head as we rode through the enemy's ranks. The extract commences at the time of Captain GOLER's being challenged:

"General STUART dispatched Captain WHITE of our staff, to FITZHUGH LEE with orders to send on one of his regiments as soon as possible and to follow slowly with the rest of his brigade. General STUART and his staff were trotting along at the head of the column, when, at the moment of emerging out of the dark forest, we suddenly discovered in the open field before us and at a distance of not more than one hundred and sixty yards a line of hostile cavalry, who received us with a severe fire which concentrated on the narrow road. Fully conscious of our critical position, STUART drew his sword and with his clear ringing voice, gave the order to attack, taking the lead himself. For once our horsemen refused to follow their gallant commander; they wavered under the thick storm of bullets; soon all discipline ceased, and in a few minutes the greater part of this splendid regiment, which had distinguished itself on so many battle-fields, broke to the rear in utter confusion. At this moment the enemy's bugle sounded the charge, and a few seconds after we brunted the shock of the attack which broke upon us like a thunder cloud, and bore our little band along with its vehement rush, as if driven by a mighty wave, sweeping us along with it, in the darkness of the forest."

During the night and next day, the scattered remnants of the regiment were brought together and reformed within our lines. On Saturday afternoon, General SICKLES occupying a position near the right of the line, seeing STONEWALL JACKSON's flank movement, thought the Confederate army was about to retreat, and called for the cavalry to help in their pursuit. What was left of the "Old Sixth" was deployed as skirmishers. When the heavy firing gave the first indication that HOWARD's Eleventh Corps was being attacked, an aide-de-camp from him galloped up to General PLEASANTON and asked for cavalry to check the enemy's advance until he could reform his

line. Major KEENAN commanding the Eighth Pennsylvania, was sent with his regiment to charge the head of the advancing column, while General PLEASANTON put his batteries in position, faced to the rear and double shotted with canister, awaiting the appearance of the enemy. The Seventeenth Pennsylvania and Sixth New York were engaged in trying to arrest the wild flight of the demoralized Eleventh Corps, who in the greatest confusion were running over the batteries already in position; while more artillery was stopped and, with the help of the cavalry, given a field for action. General SICKLES seeing the danger, told General PLEASANTON to hold his ground at all hazard until he could put his Third Corps in position to hold the ground which was the key to the position of the whole Union army, for with STONEWALL JACKSON in possession of this elevation, he would not only be able to throw his shells into the headquarters at the Chancellorsville House, but from the rear pour an enfilading fire upon the entire army.

While this was going on the Eighth Pennsylvania with KEENAN riding at their head, charged on the advancing corps of STONEWALL JACKSON. Brave KEENAN fell, saber in hand, and scores of his gallant troopers with him, but the advance was checked until PLEASANTON and SICKLES had completed the formation that was to turn back that advancing host; which without this check would have continued on and swept all before them and driven our army back to the Rapidan.

"By the shrouded gleam of the western skies,
Brave KEENAN looked in PLEASANTON's eyes
For an instant, clear and cool and still;
Then with a smile, he said: 'I will.'

"Cavalry, Charge!" Not a man of them shrank,
Their sharp, full cheer, from rank on rank
Rose joyously, with a willing breath,
Rose like a greeting hail to death.

"And full in their midst rose KEENAN, tall
In the gloom, like a martyr awaiting his fall,
While the circle-stroke of his saber, swung
'Round his head, like a halo there, luminous hung.

"They raise no cheer.
They have ceased, but their glory shall never cease
Nor their light be quenched in the light of peace.
The rush of their charge is resounding still,
That saved the army at Chancellorsville."

As the enemy advanced General PLEASANTON gave the order to fire and those twenty-two guns carried death and destruction into the enemy's ranks. Three times they charged, but they could not

stand the hail-storm of shot, and fell back leaving their dead and wounded. General SICKLES' line was formed and the army saved.

From this time the cavalry played an important part in all movements of the Army of the Potomac. A few weeks later that tournament with all of STUART's cavalry in and about Brandy Station, followed by the cavalry engagement at Gettysburg, established its reputation, which later under the leadership of General SHERIDAN became known the world over.

The following General Order was issued after Chancellorsville :

GENERAL ORDER, }
No. 27. }

ARMY OF THE POTOMAC,
May 10, 1863.

The General Commanding takes this occasion to commend the conduct of the "Second Brigade" and MARTIN's Sixth Independent New York Battery in the late engagement near Chancellorsville. The distinguished gallantry of the Eighth Pennsylvania regiment in charging the head of the enemy's column advancing on the Eleventh Corps on the evening of the 2d inst.; the heroism of the Sixth New York regiment in cutting its way back to our own lines, through treble its force of the enemy's cavalry on the 1st inst.; and the coolness displayed by the Seventeenth Pennsylvania regiment in rallying fugitives and supporting the batteries, including MARTIN's— which repulsed the enemy's attack under JACKSON—on the evening of the 2d inst., have excited the highest admiration.

These noble feats of arms recall the glorious days of Middletown, Boonsboro, Antietam, Martinsburg, Upperville, Barber's and Amisville where the First Brigade shared with us the triumphs of victory, and they will now, while exulting in this success, join in sorrow for the brave who have fallen. The gallant "McVICAR," the generous "KEENAN," with one hundred and fifty killed and wounded from your small numbers, attest to the terrible earnestness that animated the midnight conflict of the "2d of May."

A. PLEASANTON,
Brigadier General, Commanding.

W. L. HERMANCE,
*Late Lieutenant-Colonel,
Sixth New York Volunteer Cavalry.*

THE PROPER EMPLOYMENT OF CAVALRY IN WAR.

THE people of the United States are fortunate both in their form of government and in their geographical situation; the former guarantees the security of life, liberty, property and an opportunity for the highest individual development of the citizen, whilst the latter secures them from the fears, alarms, expense of preparation and constant readiness for foreign war.

Since the days of MORGARTEN certain political rights of the individual citizen have been recognized in all civilized governments, and nations can no longer be driven to war at the will or upon the caprice of their princes.

International communications and commerce have multiplied as the arts and sciences have advanced; disputes are sure to arise, and whilst the human disposition remains as it is, war is inevitable. If a nation wishes to be respected, it must maintain an army; and in case of war, if it hopes for success, this army should be officered by intelligent, highly educated men, devoted to their profession, and animated by the highest patriotism.

Our country is not threatened by powerful or warlike neighbors, hence we are saved from that ruinous competition in armaments which is so oppressive to the industries of Europe. But for the security of the nation we must keep a small standing army to serve as a nucleus for the great volunteer forces upon which we depend in time of war. For purposes of interior police, to keep up military traditions and instruction in the latest phases of the art of war among our people, there should be at least one soldier to every 2,000 inhabitants. The organization of this army and the regulations governing it should serve as models for the volunteer forces. The staff corps should be capable of indefinite expansion, without friction; the organization of the cavalry, infantry and artillery should be of a nature most adaptable to the character of our new levies, in order that the volunteer may not be hampered in his individuality more than is necessary for the cohesion of the mass. The cavalry, infantry and

artillery are the real fighting divisions or services of all armies. Each has a special mission peculiar to itself and a skillful combination of these three elements upon the same field, so that each can employ its utmost powers to the greatest advantage, tests the abilities of the great commander.

We propose speaking of the cavalry branch of the service only, and in discussing the proper employment of cavalry in war, a short account of its organization is deemed necessary to a proper understanding of its possible uses.

All civilized nations, except our own, have organized their cavalry into troops, squadrons, regiments, brigades and divisions. The law organizing our army, creates the troop and regiments only. The services of our cavalry since the Civil War have really required only such an organization. If the necessity should arise requiring larger bodies of cavalry to act together, the brigade and division would undoubtedly be formed.

Our drill regulations prescribe the battalion as the fighting unit. The battalion normally consists of four troops, but may contain a less number or a greater number, not exceeding seven. The law authorizes ten regiments of twelve troops each and prescribes that each troop shall consist of one captain, one first lieutenant, one second lieutenant, one first sergeant, five sergeants, four corporals, two trumpeters, two farriers and blacksmiths, one saddler, one wagoner, and such number of privates as the President may designate, not exceeding seventy-eight. Under the present orders, two troops in each regiment have been disbanded, leaving none but the commissioned officers; and the enlisted strength of the remaining troops is fixed at sixty each.

A detailed account of the organization and services of our cavalry of to-day will *not* give a correct idea of the proper organization or employment of cavalry in modern war.

Our battalion is too unwieldy, and lacks the proper cohesion for a fighting unit. The line is too long or the column is too deep to be under the control of one voice. Many errors are committed upon the drill ground, simply because the voice of the battalion commander can not reach the subordinate officers. The imagination can easily picture the confusion that would arise among the jingling of sabers, the clattering of hoofs, the dust, the noise of explosions and the excitement of the battle-field.

The battalion is too large a unit to use for the purpose of keeping immediate contact with the enemy, and the troop is too small. Two troops could be used, but they lack that cohesion and completeness

which are so necessary for contact service and, as a consequence, the duty would be imperfectly performed in some of its minor but vital details. The squadron can do the duty perfectly; it is a fighting unit; it is sufficiently strong to furnish all the necessary patrols for a reasonable area, to supply the number of messengers that have to be constantly sent to the rear, to keep a sufficient reserve to support the contact groups when needed, and it is perfectly mobile. The substitution of the battalion in our cavalry organization as the fighting unit for the squadron, is an innovation unwarranted by centuries of experience, and can be explained only upon the ground that at the close of the Civil War, a mania for uniformity possessed our military authorities, and an assimilated drill and organization for the three branches of the service were thought to be the *ne plus ultra* of military excellence.

It is to the cavalry in Europe that we must look for proper organization, and to some extent, for its proper employment in war.

Europe could have learned much by studying the employment of our cavalry during the Civil War, for SHERIDAN vastly enlarged the field of its usefulness. Throughout the entire history of its existence cavalry has performed almost every conceivable duty during war, but many of its feats were the result of the genius of its commander at the time, and hence could not be repeated in another era; or they were the result of accidental circumstances and no general tactical principle could be deduced.

Improvements in the fire-arms of infantry and artillery within the last twenty-five years have somewhat changed the functions of cavalry in particular cases. They have not only added to its value as a fighting factor, but they have vastly enlarged its field of general utility. These improvements were first practically applied in the war of 1866, but the full force of the lessons taught and the tactical deductions therefrom, were not fully demonstrated until the war of 1870-71. The new conditions required a different tactical employment of the three branches of the service, and to a certain extent a change of organization.

The cavalry retained the time-honored squadron which generally consists of two troops; but the squadron of about 130 men is the fighting unit. The regiment consists of four, five or six squadrons. There is not uniformity in this respect, nor is it necessary; but four squadrons to the regiment is the general rule.

The brigade is usually composed of two regiments—this is not uniform however, but it is found by experience that two regiments

must be regarded as the maximum that can be efficiently handled by the direct personal influence of one man.

A cavalry division consists of three brigades, but even here, the model formed by experience is not uniformly copied. A division formed of two brigades is objected to on the ground that detachments are unavoidable and the fighting strength of the division would be so reduced, that the great tasks devolving upon it during war, could not be efficiently executed. In the cavalry combat, the leader who brings forward the last reserve is usually successful. One brigade placed in the first or fighting line; a brigade in the second or maneuvering line, to protect the exposed flank and reinforce the first line during the *mêlée*, and the third brigade, either wholly or partially as a reserve, seem to be the natural distribution of a division of cavalry for the combat.

During the combat, events succeed each other so rapidly that a leader should see at a glance, every feature of the fight as well as everything which transpires in the vicinity of his troops. This is necessary to the exercise of his principal influence, which consists in skillful management and well-timed movements of the reserves, and these reserves should belong to the same organization and be under one commanding officer. A division of three brigades naturally fulfills these conditions.

The instant the *mêlée* takes place the individuality of every unit in the fighting line becomes lost, and in the case of a repulse, the leader can regain control of his men only when the adversary ceases from the pursuit, or when he, in turn, is driven back by the arrival of fresh troops. In case the troops are successful, the noise and confusion of the pursuit are so great that still some time must elapse before the leader can cause the men to feel his controlling power. It is because of this temporary loss of control over the men, that the influence of the second and third lines entering the fighting group, becomes of so much more importance in a cavalry combat, than in an engagement between other arms of the service.

In an organization of a less or a greater number of brigades, a second or a third line may be formed, but the third line, the last reserve, must either remain at the disposal of the brigadier or regiments may be retained by the division commander at his own disposal. In the latter case the organic cohesion of the troops has disappeared and when called upon for action, they find themselves in a loose and unusual formation.

Generally, the cavalry is classed as heavy and light—we make no such distinction in our service. Our cavalry is sufficiently heavy for

all duties required of modern horsemen. Heavy cavalry grew along with European institutions, and from motives of economy, as they have the heavy horses and have to utilize them; and we suspect it to be a trace of feudalism—the remains of the days of chivalry—a remaining impress of the dark ages. The distribution and armament of these heavy and light regiments do not enter into this discussion.

The organization of the cavalry division would not be complete without horse artillery. The operations of a large body of cavalry could be so impeded and restricted as to render it of but little effect during war if deprived of horse artillery. Small detachments of an enemy occupying a defile, a bridge, or other small and natural defensive position, could delay the march of a great body of cavalry, or exact sacrifices from dismounted men, much out of proportion, should cavalry not be in condition to drive them out by a few shells. An enemy's column must deploy when the artillery opens fire upon it, and the advance of troops in considerable bodies, over ground not suitable for cavalry movements, can be delayed or entirely prevented by the fire of artillery. Horse artillery should therefore be permanently attached to the cavalry division. The number of batteries to be attached depends much upon the character of the country and the special nature of the service required of the division. Its ordinary duties often require the temporary detachment of a brigade, and this should be accompanied by a battery, and there should be at least one battery with the other two brigades. Not less than two batteries should be so attached, and a third battery will frequently be needed.

There must be a signal or telegraph corps, a hospital corps, an ammunition and supply train, permanently attached to the division. If each wagon were to haul 4,000 pounds, it would take about seventy of them to haul three days' forage for the animals alone. This gives only a vague idea of the extent of the transport trains, but it is enough to indicate the impedimenta absolutely necessary, in time of war, even with the fleetest and most mobile part of a great army.

In some services there is a regiment of cavalry permanently attached to each infantry division. This is called the divisional cavalry, and must not be confused with the cavalry division described above.

The duties of this cavalry are: To furnish a cavalry contingent for infantry advance guard, to cover the road or roads on which the infantry division or its brigades march, to provide patrols to look out for the enemy in every direction, to thoroughly search the country immediately in advance of the infantry, to keep up communications with the parts of the infantry division that may be marching on

other or parallel roads, to feel for, establish and keep up communications with troops marching on roads parallel to those used by its own division, to keep up communications with such troops as may be marching in front or rear, thus freely communicating with all the component parts of the army corps, to keep up communications of the latter with the army and with each other, and to provide orderlies for general officers, and such escorts as may be needed from time to time.

The employment of this divisional cavalry upon the battle-field, during pursuits and retreats will become apparent during this discussion.

The cavalry division is an independent tactical body, and stands in a strategical rather than a tactical relation to the rest of the army. Its service is rendered in advance of the army, where it acts as a screen, preventing the enemy from seeing or learning of any movement during the strategical period of the campaign. It is of equal importance that the cavalry division should see and know of every movement made by the enemy during this period, and report them to the army commander.

Before starting on his mission in advance of the army, the cavalry leader should be given all the information by the army commander that is in the possession of the latter, regarding what is known of the enemy, his possible position, his probable intentions, his line of communications, etc. If possible, he should be furnished with a map of the theater of operations. The army commander should inform him about when and in what direction it is probable that his own army will move. He should be informed of the present intentions of the army commander and he should be told what the latter is the most anxious about at the present moment. Finally, the cavalry commander is informed where he is to send his first reports and where he can rely upon getting support from other bodies of troops.

This information will probably be meager enough at first, but it is very important at the beginning; and the cavalry commander soon places himself in position to furnish, in his turn, all that relates to the enemy.

The cavalry commander now sets about the two tasks of executing strategical reconnaissance and covering the front of his own infantry forces. In the execution of this duty the cavalry must prevent a similar action on the part of the enemy. At the commencement of operations, before contact with the enemy, and in the absence of knowledge of his strategic deployment, it is better for the bulk of the cavalry to keep what are thought to be the central

routes, the brigades marching on parallel roads, so that, if necessary, a rapid concentration may be effected.

Each detachment will form its own special advance guard, and they must keep up constant communication with each other. All roads, trails and special features of the country must be patrolled and thoroughly examined. Detached squadrons must be sent far to the front.

The theoretical distribution of a cavalry division covering the front of an army, is about as follows: Two brigades of the division are in advance; each brigade keeps one regiment in first line. These regiments together cover a front of from twenty to thirty miles; this front depends upon the extent of the army covered, the proximity of the enemy, his enterprise, whether he is advancing or retreating; if the latter, whether it is after a defeat or is simply a retreat in maneuver, and many other conditions which naturally prescribe the extent of the front in each special case.

Each regiment observes from ten to fifteen miles, keeping two or three squadrons in the first line, the rest follow as near the center as circumstances will permit, in compact order. The number of squadrons kept on the first line in each regiment, will depend upon the ground, the enterprise of the enemy, and other circumstances which require sound judgment on the part of the commanding officer on the spot. The advance squadrons must keep up thorough communication among themselves, with each other, and with the remainder of the regiment in the rear. The second regiment of each of the two advance brigades, follows the first regiment in compact order, two or three miles in rear of its center. The third brigade of the division follows in rear of the center of this second line, as a reserve, at a distance of about five miles. There is a battery of horse artillery with each of the advanced brigades. If there be a third battery, it is with the reserve brigade. The movements of the cavalry are, of course, determined by those of the enemy; and the distance between these lines, and also the distance in front of its own army, will depend upon the progress made by the two armies, but as a rule, the latter distance will be twenty to thirty miles—two or three days' march.

The less resistance the advanced squadrons meet, the looser the first line may be, and the more extended may the reconnaissance be made. The main body of the cavalry should always be moved toward the point where the strongest resistance is expected; in other words, it should be moved where it is supposed the enemy's strongest force is located. If, in conforming to this rule, the main body should be placed in rear of one of the wings, and the extent of front such as to prevent ready support to the other wing, the latter must

be allowed great independence of action, and, in certain contingencies, a special line of retreat must be indicated. Large detachments during a reconnaissance are a necessity from the very nature of the service, but the general rule is, to keep the forces as near together as circumstances will permit.

The cavalry having been deployed upon the proper front, begin their work of finding the enemy and obtaining all possible information regarding him. This work is done by the squadrons in the first line—what are technically known as the contact squadrons.

The chief of squadron pushes forward, detaching platoons or patrols, as circumstances may require to reconnoiter particular localities. Each patrol sent out is given a special task to accomplish; each chief of platoon receives specific orders, usually verbal, regarding his duties and the mission he is to go upon. The squadron commander should always keep not less than one platoon—a fourth of his squadron—in reserve to support any part of his command that may need it. The chiefs of platoon move in the directions indicated, sending patrols of a non-commissioned officer and a few men—the fewer the better, so the object be accomplished—to examine the country, find traces of or sight the enemy, make a prisoner, and generally get all possible information of the enemy. They must make inquiries of the inhabitants, particularly if they be coming from the direction of the enemy and prevent the inhabitants from going in the direction of the enemy. If a telegraph station, lately in the possession of the enemy, can be reached, these patrols, reinforced if necessary, must take it and confiscate the dispatch book and all papers that are likely to give information. They must enter the post offices and capture the mails, enter villages, question the inhabitants, particularly the most prominent and those who are likely to be the best informed—ministers are good subjects for such catechism and bright children who know no guile—take all maps and newspapers, especially if the latter be printed within the enemy's lines. The country must be flooded with these inquisitive horsemen, always asking questions, getting information and at all times pushing forward, and if checked, simply halting whilst those on the right or left turn whatever halts them. Finally, when the enemy has been once checked, contact must never be lost, unless orders to that effect be given by proper authority. The cavalry fastens upon the enemy in such a way that the points keep up an unbroken touch with his front, whilst the officers' and other patrols hang on to his flanks where they have ample opportunities for observation. The moment that important information is obtained it is sent to the rear, where it is

transmitted by the most expeditious means to the army commander. When the enemy has been found, all surplus parties should be drawn in and only such parallel and flank roads be observed, as in the nature of the case are likely to be used by the enemy. The cavalry must be able to learn and report every movement of the enemy, and also to oppose in force, any attempt he may make to prevent the reconnaissance or to make one himself.

Fighting is not the object of the cavalry when covering its army; information of the enemy is what it wants, and this information is obtained by the patrols, either in small parties or acting singly; they are to see and not to be seen by the enemy. If chased by the enemy they should take every advantage of the ground for the purpose of getting out of his sight, and when that is done, they should make a detour, avoid him and complete the observation. Of course occasions will arise, when a bold, headlong advance is the only way to accomplish the desired inspection. At such times to hesitate is to waste opportunity, and the cavalryman who lacks resolution is as much out of place as were the money changers in the Temple.

To reconnoiter a hostile position previously to attacks or battles, officers' patrols are almost exclusively employed. They endeavor to observe the enemy's position, his strength and his reserves, the extent of his lines, the most available point of attack, and the topography of the ground occupied by him and in his front. Their success principally depends upon the bravery, quickness, coolness, ingenuity and military *coup d'oeil* of the officers conducting them.

The contact squadron has the most trying duties in time of war, of any of the tactical units. As every squadron is liable to be called upon for this duty, in order to accomplish it thoroughly the cavalry soldier must be trained as an individual, as well as one unit of a large mass. His individuality must be thoroughly cultivated, his knowledge and ability must be continually improved, and at the same time his power of acting as only one in large masses must be kept in view. It is by his intelligence and vigilance that the great mass of infantry and artillery in his rear can enjoy quiet and repose after their hard day's march, free from disturbance caused by vague rumors and alarms. The annoyance which such cavalry can cause an enemy gives them an uneasy feeling of insecurity, and will eventually demoralize the best army in the world.

The French give many graphic accounts of the daring and enterprise of the Prussian horsemen in 1870-71. Colonel BONIE says: "Arrived at Sarrebourg, the regiments were reformed. We received in the middle of the day of the 8th of August orders to saddle and

mount, because the enemy's cavalry was in view; some scouts were mistaken for the head of numerous columns. From that moment until we reached Luneville their scouts watched us unceasingly. Linked to their army by horsemen, they gave an exact account of our positions, of our halts, of our movements; and as they watched us from some little distance, incessantly appearing and disappearing, they spread uneasiness." This was the cavalry that destroyed the railroad junction at Nancy, and prevented the Sixth French Corps from receiving its reserve artillery, ammunition and engineers. This corps, a few days later, defended St. Privat, on the French right at the battle of Gravelotte, and much of their disaster at that place is attributable to the fact that this corps was tactically incomplete.

Another officer says: "We saw on a hill one or two thousand yards off on our left, three small groups, one mounted, the others in advance dismounted; on the slopes of the little valley that divided us, we saw a single horseman entirely exposed, alone in the fields near a hamlet, the inhabitants of which stared at him in surprise. We could not deceive ourselves, it was the enemy. One of the dismounted parties mounted and disappeared followed by the others. The single horseman, after carefully watching us, vanished also."

These contact scouts had passed twenty-four French squadrons, two divisions of infantry, the reserve artillery and baggage and were dogging the flanks of the leading infantry division of that retreating army.

General VINOT says of his retreat from Mézières: "From that moment we became the object of continual and rapid inspection from the enemy's scouts. They kept galloping on our flank, just out of range, seeking to see the head of our column and so calculate its force and report to their supports."

Actual fighting is only a means to obtain an end, and cavalry should resort to it only when maneuvering and demonstration cannot sufficiently intimidate the enemy to allow it to accomplish the reconnaissance in a satisfactory manner.

If a portion of the line should become engaged with the enemy, it will be supported from the rear by the nearest troops, and at the same time the other troops will be notified and they will advance resolutely to support the engaged line by an attack on the flank or rear if possible. If the enemy's cavalry be properly led, there will be a similar concentration of his forces and a cavalry action will ensue. The formation for this action will be governed by principles laid down in the tactics for this arm, but there are certain general prin-

ciples to be observed for which the maneuver tactics provide the detailed execution.

The charge is the very acme of cavalry life. As the brook leads to the river, which in turn flows to the ocean, the sum of all waters, so the charge is the life element of cavalry, and all instruction should point to it as the grand consummation of cavalry existence. The mode of its execution may not always give it success, but it certainly does fix its value as cavalry. The alignment must be good, the men riding stirrup to stirrup. The charge itself should cover from eighty to one hundred and fifty yards, the speed somewhat regulated by the utmost paces of the weakest horses, the officers in front where all the men can see them, the latter riding resolutely with no hanging back. The thought should be absorbed by the business in hand, and at the command, "Charge," "all should commend their souls to God and charge home."

Previous to the charge scouts should be sent to the front to observe the ground which is to be passed over before reaching the enemy, in order to give warning if there be any impassable obstacles, such as wide ditches, sunken roads, or any obstruction that would break the formation or create confusion in the ranks, but under no circumstances must these detached men or parties rush directly back to the lines, thereby bringing disorder into the ranks. During the charge itself the front of the attacking lines must be absolutely free, the scouts or detached parties must draw off to the flanks, rally and throw themselves upon the enemy's flank simultaneously with the collision of the attacking line. Cavalry must never wait at a halt to receive a charge; on the contrary it must meet it resolutely and at the utmost speed. When the enemy's cavalry is repulsed after the *mêlée*, the pursuit must be carried on by the squadrons engaged in the *mêlée*, the others following as a reserve; this pursuit must be kept up as long as the wind and the strength of the horses, the nature of the ground, and the measures of the enemy will permit. The time for the rally will depend on circumstances; the method is prescribed by the drill regulations, but when the rally is sounded it must be executed with the greatest rapidity. This is a matter of the greatest importance, and is thus spoken of by the great FREDERICK: "It must be thoroughly impressed on the hussar that he must be most attentive to the sound, 'Appell,' on hearing which each man will join his squadron and rank with the utmost rapidity possible; but as already stated it is not necessary that they should have the same men as before on each side or in front of them." And again he says: "N. B.—His Majesty will most particularly observe that the squadrons learn to rally rapidly."

If the charge should be repulsed the final reserves must be so disposed that they can take the pursuing enemy in the flank, to cover the rally of the defeated horsemen and to check the impetuosity of the pursuit.

If the defeated cavalry are forced to abandon the field, information of the state of affairs must be immediately sent to the army commander. The direction of the retreat should be such as to mislead the enemy and draw him off, if possible, so as to give favorable conditions to its own army. Only guiding principles can be given in this employment of cavalry, as absolute rules are out of place. The victorious cavalry should not release its hold of the adversary until he is driven behind his infantry for protection, and it must resort to every maneuver to keep the opposing cavalry intimidated, thus rendering it useless as a reconnoitering force.

EMPLOYMENT OF THE CAVALRY ON THE FIELD OF BATTLE.

The increased range, accuracy and rapidity of fire of the infantry and field artillery have modified the methods of employment, but they have by no means destroyed the usefulness of cavalry on the field of battle. The proper employment of cavalry at the right moment, has always been one of the difficult problems of war; modern arms have increased this difficulty, but they have not eliminated the problem, and its solution still tries the skill and ability of the cavalry officer. The case must indeed be exceptional when the action of modern cavalry will have a decided effect upon the opposing forces, and be the sole cause of their defeat, as has been the case in many battles of the past. Of the twenty-two great battles fought by FREDERICK, fifteen were won by his cavalry. Modern armies are so large and the front is so extended, that success at one point does not necessarily have a predominating influence along the whole line, unless that success be the seizure and retention of the key to the position; the task of doing this would not naturally devolve upon the cavalry. This arm performs the part of screening the infantry until the latter comes in contact with the enemy, when it naturally passes to the flanks and particularly to that flank which presents the best ground for the employment of its peculiar powers. There it must protect the flank of its own infantry at all times. No army can be surprised by a flank attack if its cavalry is properly posted and does its full duty. Cavalry cannot hope for success against the front of unshaken infantry, unless the ground be such that it can appear unexpectedly against the extended line; this formation renders infantry peculiarly liable to confusion if suddenly attacked by small bodies of cavalry

Success in such operations should be followed only until the infantry get into compact bodies, when the cavalry should quickly retire, leaving those bodies exposed to fire before they can again deploy.

The flank of infantry attacking in open order is the vulnerable part of the line, and the cavalry officer who has the skill and quickness to strike this weak point at the opportune moment will richly deserve the success which he will undoubtedly gain.

Cavalry may be employed to extend the lines of infantry or to occupy ground vacated by infantry which is taken away for some special purpose. Cavalry must detect any flanking movement of the enemy and act with boldness against the head of his column; as they themselves expect to attack to a flank, not to a front, their front is narrow and may be overlapped and they taken in the flank.

The attack upon infantry is made in successive lines, each line with a front of not less than two squadrons and more if necessary, for each individual object in the whole depth of the position must be struck. These lines may be two or more in number, depending upon the resistance anticipated, and there should be from eighty to one hundred yards distance only between any two consecutive lines, in order that the blows may be delivered in as rapid succession as possible.

If an infantry attack has been repulsed and the attacking troops have been shaken by heavy losses, it is the duty of cavalry to dart upon them, complete the defeat and take prisoners. If the French cavalry had been properly posted and properly handled, it would have been hurled against the masses of the Prussian Guard after its bloody repulse in front of St. Privat. This would not have prevented the German victory of Gravelotte, for the flank movement was irresistible as the French forces were at that time disposed, but it could have destroyed the Guard, and it would have rendered the retreat of the Sixth Corps less difficult.

Cavalry has at all times been employed to charge an unshaken enemy in order to delay him sufficiently long to enable its own infantry to arrive and seize upon a point, the possession of which was of vital importance to the enemy.

MARLBOROUGH'S passage of the French lines of Méhaigne in 1705, which it had taken three years to construct, is an example. By a feint attack near Namur, he induced VILLEROY to move the bulk of his forces to the right, leaving the most invulnerable portion of his lines near Leuwe but thinly guarded. Here is where MARLBOROUGH proposed breaking through. By a skillful movement of his cavalry he forded the Gheet, his cavalrymen filled the ditches of the intrench-

ments with trusses of hay which they had carried with them, passed over the works, and charged the French with such impetuosity as to delay their movements for a sufficient length of time for the allied infantry to arrive and effect a secure lodgment. This obliged the French army to precipitately abandon the lines which had been constructed with great labor and expense, and was regarded as the bulwark of France as a defense against the allies.

Notwithstanding the great range and accuracy of the modern rifle and field piece, the successful use of cavalry to delay the attack of an unshaken enemy in superior force, a sufficient length of time to enable its own infantry to maintain a key position until reinforced sufficiently to attain a declared superiority, has been demonstrated in a brilliant manner.

BAZAINE was retreating from Metz to the westward, along the Metz-Verdun road. The Third German Army Corps struck this road from the south, at a point in advance of the principal French columns, thus cutting the main line of retreat. The fighting commenced about 9 A. M. and was extremely severe. About 1 P. M. the Prussians were exhausted and getting out of ammunition. It was observed that the French were being reinforced and, unless checked in their advance, the Germans would be hurled from their position before reinforcements could arrive, and the line of retreat would be open to the French. BREDOW's cavalry brigade was the only available force that could be employed to avert the imminent danger. There were but six squadrons of his brigade present. The good of the army demanded their sacrifice, and most nobly did they respond to the demand made of them. Of course it was apprehended that a cavalry attack undertaken against intact infantry and powerful lines of artillery would prove a failure, and if successful, the losses in either case would be fearful. There was no time or means to prepare for this cavalry attack by an overwhelming fire of artillery. The brigade accidentally entered upon the charge in echelons, but after the artillery had been reached and the gunners cut down at their pieces, the whole brigade, in one line, without reserves or flanking squadrons, charged the infantry supports with such vehemence as to break through their lines, despite a terrific fire. The task was now completed beyond all expectations, but the excited horsemen swept forward, regardless of the efforts of their officers to rally them. They darted at a line of mitrailleuses that was stationed in the rear of the infantry and were cutting and stabbing at the artillerymen, when they were suddenly attacked by the cavalry of FORTON's division. The hitherto victorious squadrons, now compelled to retreat, forced

their way back through the infantry masses, when the survivors—thirteen officers and 150 men—returned with their exhausted horses to their own lines. This attack so paralyzed the French Sixth Corps that its fatal advance was never resumed; the German infantry was given a breathing spell, and the arrival of reinforcements enabled them to firmly plant themselves upon BAZAINE's line of retreat. The victory of Gravelotte, two days later, shut BAZAINE up in Metz where he eventually surrendered an army of 170,000 men.

In attacking infantry, if cavalry can approach by an ascending grade the condition will be favorable, for infantry always fires high, and under the excitement caused by the approach of cavalry, if the latter should be below them, this error would be increased.

The attack upon artillery should be made when it is limbering up, or unlimbering, or in motion, if possible. When in position, it should be attacked in flank, but as this is not always possible, an attack in front may have to be made. The number of pieces in position will, of course, determine the formation and the force making the attack, if the proper force be available. The general rule is to employ about one-eighth of the force as foragers to ride through the guns whilst the rest of the force makes the attack upon the supports. Artillery is always placed upon elevated ground and is very liable to shoot high as cavalry approach it. The quick action of cavalry constantly changes the object of fire and also the range, and as a consequence, the fire at close range is but little, if any, more fatal than that of the old field piece.

IN PURSUIT OF A DEFEATED ARMY.

To properly employ cavalry in the pursuit of a defeated army, a small force should precede the infantry and hang on to the rear of the enemy's main forces, but the mass of cavalry should operate against his flanks; seek every opportunity to cut in on his marching columns, destroy his trains and constantly harass him. This demoralizes a retreating enemy much more than the old system of constant and useless attacks upon his rear guard, which generally consists of his best troops. The rear guard itself can be flanked and attacked from its rear and ultimately destroyed. An enterprising cavalry upon the flanks of a retreating army creates a feeling of uneasiness and insecurity; it causes the enemy to make detachments to protect his flanks, it hastens his march and adds confusion, weariness and fatigue to his discouraged troops. SHERIDAN's employment of his cavalry in the pursuit of LEE's army after the battle of Five Forks furnishes the most brilliant example of this use of cavalry. After

SHERIDAN had defeated LEE's right at Five Forks, April 1, 1865, the latter evacuated the Richmond-Petersburg lines and marched westward toward the vicinity of Amelia Court House, intending to continue his retreat to the southwest in the direction of Danville. SHERIDAN moved his cavalry on the Confederate flank, struck the railroad at Jettersville Station, which he held until the infantry came up and relieved him. The infantry moved upon LEE's position at Amelia Court House, which LEE had evacuated. SHERIDAN anticipated this, and instead of taking part in the useless infantry movement he moved his cavalry on the enemy's flank to strike the road from Deatonsville to Rice's Station. The cavalry soon struck the enemy's trains, but they were so well guarded that no serious impression could be made upon them until after crossing Sailor's Creek, where it found an opening and destroyed several hundred wagons and captured sixteen guns. The cavalry firmly planted itself across the enemy's line of retreat to Danville, in advance of EWELL's and GORDON's corps. It fiercely assailed the head of EWELL's column, bringing it to a halt and battle formation. A brigade and battery penetrated the line in rear of EWELL's corps and in advance of GORDON, forcing the latter to take another road to the northward. EWELL was completely isolated and detained until the Sixth Infantry Corps came up, when his command was destroyed.

The next day, April 17th, the same plan was pursued, the main body of the cavalry hung upon the enemy's flank, whilst one division made a dash upon his trains near Farmville. On the 8th, the cavalry got ahead of LEE's army, capturing provision trains, etc., drove in his outposts, and took position about dusk in the vicinity of Appomattox Court House. The next morning, GORDON had commenced his movement to attempt the forcing of the cavalry lines, when ORD's infantry arrived after an all night's march, at the sight of which GORDON's lines recoiled without engaging, the curtain fell, and the four years tragedy was over.

THE CAVALRY RAID.

The raid, in a military sense, may be defined to be an incursion or irruption of mounted troops into the theater of war occupied by or under the control of the enemy.

The object of the raid is to ravage the country, destroy the enemy's property, supplies and stores of all kinds, take prisoners, break his communications, create confusion in his plan of campaign, call his cavalry away from some point where its presence is inimical, get information of the strength and distribution of his forces, cause him

to make detachments from his main army, or to divide his forces, if possible, prior to a strategic movement.

The employment of cavalry upon the raid is another of its duties in war, which, if well timed, well planned and well executed, always gives good results and is certain to raise the *morale* of the forces engaged in it.

The cavalry raid has been practiced from the earliest times, but prior to our Civil War, each particular raid was the result of a combination of circumstances that acted to produce it, and it was not embraced in the plan of campaign, constituting a part of it.

The raid is not encouraged in any of the cavalry services of Europe, except Russia; this power practices it in the annual maneuvers, and the results have been highly gratifying. Such service tries the skill of the officers and the intelligence of the men, developing the self-reliance and the individuality of both to a very high degree.

The time to start a raid depends upon many contingencies, such as the relative situation of the opposing armies, their lines of communication, the character of the country to be passed over, the time of the year, the distance to be traversed, whether the forces in hand are sufficient to accomplish the object, etc.; all which must be duly weighed and considered by the army commander. There are no set rules for his government in the matter, but experience seems to declare against stripping one's army of the cavalry screen just before a battle.

STONEMAN started on his raid with 10,000 men, to the rear of LEE's army, just prior to the battle of Chancellorsville; he traversed a great deal of southern territory, destroyed property and supplies, and temporarily interrupted LEE's communications, but during his absence the battle was fought and, although LEE was greatly outnumbered, he divided his army without hesitation, sending JACKSON against HOOKER's right, overpowering it and defeating the Federal army. JACKSON's march was not discovered by the Union forces until he actually made the attack. Had STONEMAN's cavalry been on the right, where it should have been, JACKSON could never have made his march unperceived; but in that case LEE would not have detached him and the result at Chancellorsville would certainly have been different.

This is an example of an ill-advised, ill-timed course of action, which, if judiciously employed, might have produced important results.

A well timed and properly executed raid may force an enemy to entirely abandon his plan of campaign. In December, 1862, General GRANT was moving his army down through central Mississippi in-

tending to approach Vicksburg from the rear and force its abandonment, or destroy PEMBERTON's army. PEMBERTON was concentrated at Grenada, too weak to risk an action, but he employed his cavalry under VAN DORN and FORREST to raid GRANT's communications in Tennessee and northern Mississippi. Holly Springs, Mississippi, was GRANT's secondary depot of supplies; VAN DORN captured the place, destroyed the supplies and broke the railroad. This forced GRANT to retire to Memphis on the river, and commence operations on entirely new lines.

A raid may be able to collect information that a reconnaissance cannot, no matter how systematically it may be conducted.

STUART starting from Taylorsville raided around McCLELLAN's entire army in 1862. He destroyed transports and supplies on the Pamunky, captured horses, mules and prisoners, broke the railroad, and learned the disposition of McCLELLAN's army. The information thus obtained determined LEE to recall JACKSON from the Valley, which was the prelude to that magnificent flank attack and the seven days' battles, which finally resulted in the withdrawal of the Union troops from the Peninsula.

Again in August, 1862, STUART raided in rear of POPE's army and struck Catlett's Station on the Orange and Alexandria Railroad. He destroyed tents, wagons, supplies and captured horses and prisoners—learned the strength and disposition of POPE's army; which information enabled LEE to plan the turning movement through Thoroughfare Gap by JACKSON, which resulted in the subsequent defeat of POPE's army.

If an enemy is receiving supplies over several different routes, a cavalry raid can be employed to destroy some of them, thus limiting his possible lines of retreat just before the inaugurating of seriously offensive operations against him.

SHERIDAN started from Winchester February 27, 1865, with 10,000 cavalymen, four pieces of artillery, eight ambulances, sixteen ammunition wagons, a pontoon train of eight canvas boats, and a small supply train with fifteen days' rations of coffee, sugar and salt. He moved through Woodstock and Staunton, where he turned southeast, and at Waynesborough destroyed the last of EARLY's forces in the Valley. At Charlottesville he turned south, destroying the railroad to Lynchburg as far as Amherst Court House. Failing to cross the James River at Duguidsville, he took a course down that stream as far as Goochland, thoroughly destroying the James River Canal to that point. Then moving north he struck the Virginia Central Railroad at Louisa Court House, which he permanently crippled, by the de-

struction of tracks, ties, stations and rolling stock, as far down as Beaver Dam Station. By a little finessing he threw the forces from Richmond off his route, and reached White House via King William Court House, on March 18th, where he found his much needed supplies. A few days later he commenced those brilliant movements that culminated in the battle of Five Forks, and the retreat of LEE's army. During this great raid over an almost impassable country—for the rains rendered the roads nearly bottomless—he had permanently crippled two lines of communication and destroyed subsistence stores of incalculable value to LEE's hard pressed army. Many other raids were made during our Civil War, but none were crowned with such magnificent results as this one.

The strategical value of the cavalry raid was fully demonstrated and brought into great prominence during the Civil War, and the future army commander or cavalry officer will be deficient in his professional education if he does not study this subject sufficiently to enable the former to weigh its strategical advantages under existing conditions, and the latter to execute it with a skill that calls forth all the mobility and physical and intellectual powers at his command.

The results obtained in our Civil War plainly indicate the raid as one of the strategical uses of cavalry in modern war, and that it is a proper employment of cavalry under the improved state of projectile weapons.

During the war of 1866, Prussia had forty-eight regiments of cavalry, and Austria had forty-one, the former numbering about 30,000 men, and the latter about 27,000. We learn that there were many cavalry combats, but there was not a single raid. When the Crown Prince entered Bohemia, the Austrians were using the Olmutz-Prague railway, and were very solicitous about its safety. They detained one corps as long as possible from the army near Königrätz for its protection. If SHERIDAN, STUART, GRIERSON or FOREST had been in command of the Crown Prince's cavalry, that line, which was parallel and close to the Silesian frontier, would have been broken, and probably the Austrian army would have fought the battle with one corps less, and it is possible that the army could not have occupied the line of the Elbe at all.

During the advance of the Prussians against Vienna, subsequently to the battle of Sadowa, a good cavalry leader, by a dash at the Prussian communications, could have delayed the movements of their columns a sufficient length of time to enable the Austrian army to anticipate them into Vienna, where, joined with the forces recalled from Italy, a new army would have arisen for the defense of

the Capital. The Prussians could have obtained good results by pushing a cavalry raid against the Olmutz-Vienna railroad. The battle was fought July 3d, and three days after the battle it was learned that the Austrians had retreated to Olmutz. One corps and the greater part of the cavalry had been sent to Vienna; the Third Corps was started July 11th, but the remainder of the army did not move until the 14th. The route taken was that down the valley of the March. Even as late as the 15th the railroad was cut at Goding by a detachment of cavalry only one day's march in advance of the infantry, and this forced the Austrians to pass over the mountains to the valley of the Waag.

The cavalry of both these armies knew nothing of fire tactics, and relied entirely upon the shock of combat. None of them could fight infantry, and consequently none of them were qualified to enter upon that wide sphere of action in which the American cavalrymen had so distinguished themselves.

FIGHTING ON FOOT.

In the proper performance of his many and trying duties, the cavalryman frequently finds himself in a situation where he cannot use his horse to the best advantage. He will frequently find himself confronted by infantry, so posted that it is impossible to get at his enemy mounted, and the defeat of whom is necessary to the accomplishment of his mission. It does not take a very formidable object, with an enemy behind it, to stop a force that can act only mounted, and if cavalry hopes for success, it must be trained to act, when necessary, as a dismounted force.

During July, 1864, GRANT wished to spring the Petersburg mine, and assault LEE's works south of the James River. To make a successful assault, he wished to entice as much of LEE's army north of the river as possible, so he detached HANCOCK's corps of infantry, and SHERIDAN's cavalry to the north of the river with that object. If LEE could not be induced to move north of the river, SHERIDAN was to raid the Central Virginia railroad. After crossing the river, SHERIDAN extended HANCOCK's lines to the right to such an extent that LEE thought GRANT was moving the most of his army to that side, and to confront the latter, LEE moved all his infantry and cavalry, except three divisions of the former and one division of the latter, to the north side, thus falling into the trap laid for him. On the 28th, HANCOCK and SHERIDAN were attacked by three divisions of infantry, most of them directed against the cavalry. SHERIDAN dismounted his men about fifteen yards in rear of a low crest, and when

KERSHAW's infantry attained the crest, the cavalry opened such a terrific fire upon them at close quarters, that human endurance was taxed beyond the extreme limit, the infantry broke and the cavalry pursued them, getting some prisoners and two flags. This stopped the Confederate offensive. KERSHAW's infantry were well drilled, seasoned troops, and had been accustomed to battle for nearly three years.

On the 31st of March, 1865, SHERIDAN formed his cavalry, dismounted, to receive the attack of five infantry brigades near Dinwiddie Court House. The cavalry were vastly outnumbered, but they reserved their fire until PICKETT's assaulting lines came within close range, when they opened upon the enemy with such a withering fire as to completely repulse the assault, and SHERIDAN's position at Dinwiddie was assured.

The next day at Five Forks, when AYRES' division of infantry attacked the enemy's works at the angle and along the refused part of the line, DEVIN's cavalry division dismounted and assaulted the line in front, charging on foot and entering the enemy's works by the side of the infantry. At the same time CUSTER assaulted CORSE's and TERRY's infantry brigades, with one of his cavalry brigades dismounted, which entered the works at about the same time as DEVIN's men, and with the other two brigades of his division mounted, he assailed W. H. F. LEE's cavalry division. Here we have the unusual spectacle of a division of cavalry fighting both infantry and cavalry, both as infantry and cavalry, at the same time.

At the battle of Sailor's Creek, April 6th, the cavalry placed themselves in front of EWELL's corps, after destroying many wagons, etc. The latter formed up ANDERSON's division of infantry behind barricades to fight the cavalry, whilst he tried to move the rest of his corps through the woods to the right to escape, but CROOK dismounted two of his brigades and in concert with MERRITT's division assailed ANDERSON's entire front, whilst with his other brigade, mounted, he overlapped the enemy's right, thus holding the entire force until the Sixth Corps of infantry came up and attacked his rear and left. STAGG's cavalry brigade was dismounted and charged on the left of the Federal infantry, extending its lines so as to completely envelop the enemy.

Many instances could be given, during our Civil War, where the cavalry successfully fought the infantry. It is absolutely necessary that the cavalry should be so armed, trained, organized and disciplined that it can not only protect itself under all circumstances, but that it can act offensively under all circumstances.

The sacrifice of BREDOW's brigade at Vionville was more than compensated for by the results. An equal number of SHERIDAN's men could have done as well under similar circumstances. The repulse of PICKETT's infantry at Dinwiddie Court House not only prevented a disaster to the Union left, but it assured the occupation of Five Forks the next day, and we do not hesitate to assert that an equal number of European cavalry, armed as they are and fighting as they are taught, could not have accomplished the same result.

Cavalry without instruction in effective fire action, will usually find itself powerless in front of infantry, and its sphere of action will be so circumscribed that no government can afford so expensive a toy.

It is claimed that the defensive power of civilized nations is so thoroughly organized that raids are impossible. Of course raids are impossible if we allow the halo of tradition to surround the cavalry so as to blind our eyes to its defective armament. The invention of the long range carbine has immensely increased the effectiveness of cavalry. Instead of finding itself powerless in front of unshaken infantry, by its superior mobility cavalry can always attack infantry with advantage, by being in superior numbers at the right time and place.

One of the hardest operations of war is to withdraw a defeated army from the presence of a victorious adversary.

After the battle of Sadowa the Austrian cavalry devoted itself to the protection of its beaten infantry, but when the fortunes of the conflict brought it in front of the victorious needle gun its sacrifice was accomplished. When cavalry leaders properly understand and teach the increased usefulness of fire tactics, their task of protecting their own defeated infantry will be simplified and can be made thoroughly effective. Fighting on foot behind cover can render the detaining fire of cavalry as galling and as effectual as that of the best infantry. Their mobility will enable them to attain a threatening flank position, and the enemy will have to take time for all the formality of a deployment for a regular assault, which the cavalry need not wait to receive unless assured of success.

At the beginning of the Franco-Prussian war we heard much of the ubiquitous Prussian horsemen, but at a later period, when the unskilled riflemen of eastern France commenced operations among the hills, the march of the Prussian cavalry was regulated by the speed of the infantry supports. It knew nothing of fire action and the horsemen who terrorized McMAHON's columns were rendered harmless by a few starved mountaineers.

In a pure cavalry combat the horse is the missile, the arm is the

auxiliary, and if the men can ride their horses at speed, preserve their alignment and strike the adversary without hesitation, they are true cavalymen and are animated by the true cavalry spirit.

The dread of the flashing saber retains its hold only upon the uncultivated mind, hence a rush of a body of horsemen has a terrifying effect upon European infantry; but our system of free schools has so enlightened the masses that our thinking bayonets can estimate at its true value, the sudden onset of the impetuous horseman, and they can take him at a disadvantage from which he cannot recover unless he be an adept in their methods.

An efficient cavalry cannot be a blind follower of precedent, but must change to suit the conditions of warfare at the time. The various inventions, improvements in arms and military appliances, have their influences, and the best cavalry will secure the greatest results by utilizing the material at hand and keeping abreast of the times.

A. E. WOOD,
Captain, Fourth Cavalry.

THE EFFECT OF SMALL-CALIBER ARMS AND SMOKELESS AND NOISELESS POWDER UPON CAVALRY OPERA- TIONS OF THE FUTURE.*

IN discussing the operations of cavalry it is difficult to avoid being drawn into the animated debate which, for several years, enthusiastic minds have devoted to the solution of the burning question of whether or not the days of cavalry charges are past, never to return. And yet, in spite of this indubitable fact, grand masses of cavalry are, at this very moment, being exercised as units on all the drill grounds of Europe; how, then, is it possible to escape the conviction that in the proper use of these masses a potent factor of future victories is sought?

And where is the spectator who can repress a profound enthusiasm and a pleasurable feeling of admiration at the sight of one of these sudden and impetuous charges, in which several regiments advancing either in line directly to the front, or in echelon of squadrons, traverse the field with the swiftness of a tempest and the force of a deluge?

At first, he hears a hollow and distant sound, which, coming nearer and increasing in volume, together with the distinct vibrations of the ground, produces an impression that can be compared only to that caused by an earthquake. Soon, in the midst of the advancing mass, the forms of individual horsemen can be distinguished. They rush past like a hurricane, each man with his lance at a charge, his body leaning forward, and horse and rider appearing as one. If the spectacle be completed by the addition of a formidable fire of artillery which has covered the point of attack with its projectiles, and the rolling fire of a numerous infantry, which unites its thick clouds of smoke to the dust raised by the cavalry; in fine, if, by an effort of the imagination, the ground is supposed to be thickly strewn with

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dead and wounded men and horses, the dreadful drama of war will be presented in all its majesty and all its horror. But all this is only a vain and empty shadow. An undue and exaggerated enthusiasm must be always guarded against in these maneuvers, where everything is arranged in advance. In truth, if an indispensable element of every combat be introduced,—the bullet, and the use of improved powder remove the clouds of smoke which now prevent the accurate aim of lines of infantry, the splendid and imposing features of the cavalry charge on the field of maneuver will be eliminated entirely.

The only reliable and practical conclusion that can be deduced from these maneuvers is that with good discipline, thorough instruction, and good horses, it is always possible to move considerable masses of cavalry at rapid gaits and with admirable precision. But it is another matter to prove the expediency of these theoretical maneuvers and the possibility of executing them in the face of the murderous fire of modern infantry, for such *will be* the fire of infantry henceforth, even if it be shaken by severe losses and the various emotions of the conflict.

Of the three arms of which the armed force of a nation is composed, cavalry is the only one which, from the most remote times, has undergone no essential change. A man armed with some weapon, lance, saber or javelin—it matters not which—and a horse, form the primordial and invariable elements of cavalry, elements, which from their very nature, are not susceptible of modification by scientific influences. On this immutability many earnest advocates of the retention of the shock action of cavalry base their theories. "Improvements in ballistics have not affected cavalry," say they; "FREDERICK and NAPOLEON employed their cavalry precisely as did ALEXANDER and HANNIBAL. Despite the combined results of the progress of ages, they were able to obtain results, if not of superior, of at least equal value. This argument is incontrovertible."

But, although improvements in ballistics cannot change the nature of either the horse or his rider, yet they may be the means of modifying the action of the cavalryman on the field of battle. A bullet may kill either the horse or the rider; the machine stops and no shock results. This argument seems no less incontrovertible than the other.

FREDERICK and NAPOLEON undoubtedly derived great benefit from the use of cavalry in some of their battles; but had ballistics in their epochs made sufficient progress to be able to exert much influence on the battle tactics of cavalry? Was not this a period of transition when many veteran soldiers could still recall the days of the pike

and of compact battalions like the ancient phalanx of Greece? Long after the wars of the Empire the infantryman, after sighting the hostile cavalry, had time but for one shot from the clumsy flint-lock in use, which often missed fire, and the cavalry was upon him; he was compelled to trust to his bayonet under conditions affording perhaps, fewer chances of success than those of the ancient pikemen, who undoubtedly had a weapon very effective at the moment of shock.

On the contrary, it is the very immutability of the element, composed of the man and horse, that constitutes the weakness of cavalry as opposed to the constantly augmented preponderance of the fire of infantry. This can be proved beyond the shadow of a doubt. To be convinced, it is only necessary to scrutinize the table showing the results of the trials of the rifle of the model of 1886.

The following are the probable results of collective fire directed at lines of cavalry drawn up in two ranks:

At 800 yards.....	21 hits to 100 shots fired.
At 700 yards.....	25 hits to 100 shots fired.
At 600 yards.....	29 hits to 100 shots fired.
At 500 yards.....	35 hits to 100 shots fired.
At 400 yards.....	43 hits to 100 shots fired.
At 300 yards.....	53 hits to 100 shots fired.
At 200 yards.....	62 hits to 100 shots fired.
At 100 yards.....	64 hits to 100 shots fired.

These figures speak for themselves. According to them, at 300 yards, a battalion of 800 rifles firing at a line of cavalry in *double* rank, would make 424 hits; now, this is about the effective strength of a modern regiment of cavalry. If we suppose the regiment to begin the charge at 800 yards from the position of the hostile infantry, and to be fired upon but once while passing over each space of 100 yards, it will, in accordance with the above theory, meet with 2,656 casualties; that is to say, it would be annihilated eight times over. But the events of the battle-field are not determined by any such mathematical formulæ; if they were, the question of charges of modern cavalry would have been set at rest long ago; for, even if armed with a breech-loader of the earliest pattern, the Chassepot for example, which was much superior to others, a body of infantry had nothing to fear from a charge of cavalry. Yet every one knows that in the war of 1870-1871 several charges met with complete success.

To what is this due? It is due to the fact so often stated that the emotions of the human mind are a powerful factor in the conflict, on account of their influence in depriving the marksman of his coolness, affecting his physical powers, and, as a consequence, reducing in so

large a degree the theoretical percentage of hits as to nullify all calculations. It was for such a reason that BREDOW's brigade at Rézonville was able to reach the front of the division Lafont de Villiers, to pass through and cut to pieces several of the batteries of the Sixth Corps, and when attacked by the French cavalry, to regain its position by the same road by which it came, at a gallop, with a loss indeed, of three-fourths of its strength, but after having gained an important tactical success.

On this memorable and unprecedented feat of arms the advocates of the shock rely in their efforts to prove that the improvements in arms will not succeed in doing away with the cavalry charge, if well conducted and executed by men of courage, and favored by certain accidents of ground, which it will not be difficult to find upon the vast battle-fields of the future. We will admit the cogency of their arguments if we are to be compelled to deploy our infantry for the combat, with an antiquated armament, in obsolete formations, and an artillery left without support, on account of its position in rear of the infantry.

But, on the other hand, if our infantry is supposed to be armed with our new rifle which, even with the bayonet fixed, gives results five times greater than those of the Gras rifle, and which has a penetrative power such that the bullet at 2000 meters will pass through two men; then the much vaunted charge of BREDOW of which the Germans are justly proud, would have undoubtedly failed, and not a man of the brigade would have escaped.

If to the source of superiority arising from perfection of firearms there be joined another of an entirely novel and unforeseen nature, as the use of smokeless powder on the field of battle, then there can be no doubt that all the efforts of cavalry, whether it acts in great masses or small detachments, by isolated or concerted movements, will be of as little avail against lines of infantry, however shaken and weakened by the combat, as though directed against walls of stone.

The extent to which the advocates of the charge rely for the maintenance of their theories upon the moral effect produced by the sights and sounds of the battle-field will be apparent from a remarkable and widely known article published in the *Revue des Deux Mondes* in September, 1889; from it can be judged how far the spirit of partisanship may influence even the most enlightened minds:

"However that may be, it may be claimed that the magnificent results of the experiments on the drill ground will be decisively reversed on the field of battle. Firing upon inert targets is a very dif-

ferent thing from firing at objects endowed with powers of locomotion and resistance. For these simulated effects is substituted terrible and perceptible danger, together with the consciousness of invisible death hovering in invisible space. The marksman will be unnerved by apprehension, blinded by smoke, deafened by the noise, and agitated by a thousand different and violent emotions; he bears within his breast, not a cunningly devised and constructed mechanism, but a heart susceptible of every kind of impression. Will he then, be able to estimate distances, adjust sights, and aim with accuracy, when threatened by a cavalry charge? if he could do so, cavalry would have been swept off the field thirty years ago."

After perusing these lines the reader will, of course, ask whether the writer ever set foot upon a rifle range. If he had he would know what he seems to be ignorant of, viz: that the marksmen are not blinded by smoke, for smoke is a thing of the past; neither do they have to take heed to their sights nor to estimate the distances; by firing straight to the front with their sights at 600 meters they will sweep all the ground up to 800 meters, converting all this into a dangerous space of an intensity unknown in the past. At such a moment who would think of requiring the infantry to take accurate aim? Let them fire straight to the front—that is all that can be asked of them, and that is enough. Only such balls as are fired too high will miss the mark, those which fall short will ricochet of course, but the new trajectory will be so flat that they will not rise above the heads of the advancing troopers and scarcely any will miss the mark.

Those fired too far to the right or left of the point aimed at will be equally effective, if they do not pass beyond the flanks of the line of horsemen; only these last will be absolutely lost. When the cavalry moves forward to the charge, the infantryman need not attempt to regulate his fire nor to estimate distances; he first fires several volleys at the word of command, then he begins the rapid, independent fire, and lastly, he empties his magazine, if the charging squadrons approach to within a short distance. He has to accomplish but two things, to keep his sight at 500 meters and to aim at the hoofs of the horses. Is this too much to ask of him, whatever his mental perturbation?

As for the cavalry, it will be obliged to take up the gallop in order to be under fire as short a time as possible, and cannot possibly escape annihilation, if exposed to the fire of which the table of the results of the trials of the rifle of the model of 1886 enables us to form an idea. The percentage of losses given by this table, fanciful and exaggerated as they may seem, are in reality a close approximation to the results which would undoubtedly be obtained in actual war. We

have been long advancing towards a point where fire action will have an absolute preponderance and a mathematical precision. Mechanical science has produced this wonderful result. All those who have kept themselves informed in regard to the progress made in the improvement of fire arms have not a shadow of doubt on the subject.

In proof of this assertion, it suffices to consider the results achieved by mitrailleuse fire. A Maxim mitrailleuse, without being overheated, will, at one discharge, cover a given space with 300 or 400 bullets, and with such precision, if worked by one skilled in its use, that it would mow down two or three squadrons in line, as a scythe mows down all the blades of grass which it meets. But, they claim, there is a vast difference between the fire of the drill ground and that of the battle-field, and a difference so essential, that the results of the latter cannot be deduced from those of the former. This may be so, but at all events it is diminishing from day to day, and, if the human element still continues to play the principal part in the combat, it will be freed from its emotional fetters, which formerly compelled it to passively submit to be ridden down by the charging cavalry; this grand result is due entirely to the confidence which the infantryman feels both in the arm which he has and in the power of its fire.

Up to the present time the powder used was such that, after the first discharge, a thick line of smoke concealed the line of cavalry from the view of the infantryman. The danger, being unseen, was only the more terrible, for, at each instant, the curtain might be rent by the impetuously advancing enemy. From this mainly arose the panic, terror and dismay that paralyzed his physical force and destroyed the efficacy of his fire. Besides, if he preserved his mental equilibrium, the target being invisible, he could not aim at anything, and fired at random into the smoke that masked his horizon, which he must see in order to be able to direct his fire parallel to the surface of the ground. It was by taking advantage of this smoke, which often completely covered the lines attacked, that a few charges of cavalry succeeded in the last war.

Foot troops have also, at times, met with like success. The last British campaign in the Soudan furnished several remarkable examples. With the new powder, the smoke no longer conceals his adversary, who will remain about two minutes exposed to his fire, and he will be able to secure the full advantage of his position. The danger which is impending will be almost instantly despised, and confidence will quickly return to the heart of a man holding in his hand a rifle, capable, in a few seconds, of covering with bullets the path to be traversed by his enemy. He will understand that his existence

depends on his coolness and the skill with which he fires, and as the target is visible and increasing in apparent dimension as it comes nearer, he will aim with care, the more so as he will pay no attention either to his sights or to estimating the distance. Then it will be seen whether the results indicated in the tables of the Normal School of Musketry (*l'École normale de tir*) are in accordance with those of the battle-field. On this day the shock action of cavalry will have been abandoned never to be resumed.

The advocates of the charge are not ignorant of all this; and they have been compelled, in order to avoid the abandonment of this maneuver, which they consider the grandest, most noble, and most heroic of the profession of arms, to look for precedents other than those of the wars of recent years, which the terrific power of infantry fire has rendered unsatisfactory; they have gone back eighty years and have borrowed from the Napoleonic era the tactics of masses and successive attacks. Certainly if brilliant valor, self-sacrificing devotion and heroism could deprive fire-arms of their brutal superiority, the grand school at which they seek enlightenment is well capable of restoring to them their wonted supremacy on the field of battle. But they have henceforth to deal with forces of such preponderating strength that a new procedure is imperatively necessary. Only by opposing the ones to the others will they be able to continue the conflict until it becomes impossible, which will be when the energy of these forces reaches its maximum.

Let us see whether the theory of masses as set forth by many cavalry officers, many of distinguished rank and service, is calculated to realize their hopes. In all their discussions on this important subject, the advocates of the shock always suppose that the infantry attacked has been decimated and demoralized by a long and sanguinary struggle, while the cavalry, which charges it is in the full possession of all its vigor, and that all the conditions are suitable to enable it to act with impetuosity and moral energy which are the most reliable pledges of victory.

Since they are naturally able to choose the moment proper for entering into the combat, they may be allowed to assume the data of the problem, but they will not refuse us the privilege of subjecting their conclusions to severe examination. We will admit that cavalry will often find itself opposed to infantry which has been weakened both physically and morally by various causes. But that cavalry can attack under conditions physical and moral, such as to enable them to crush the infantry, we emphatically deny.

"*L'École supérieure de guerre*" discusses this weighty subject as follows:

To fulfill its mission cavalry must be prepared to attack infantry, not only when the latter is demoralized and disorganized, but also when it has preserved its steadiness and coolness, and is fully provided with its usual means of defense; it must attack in front, if need be, as well as on the flank. It must be noted that by the expressions used is not meant a perfectly intact infantry or fresh troops, upon whom the combat has as yet made no impression.

When cavalry is called upon to act in the manner referred to, the infantry is supposed to have been for a considerable time exposed to an overwhelming fire, both of artillery and of musketry. Even if this fire has not succeeded in crushing and disorganizing it, there is no doubt that the prolonged tension of all the faculties of the troops will have caused them to feel a physical fatigue and a moral lassitude which will diminish their powers of resistance and increase the chances for the success of the cavalry.

In spite of this, even if the conditions are those usually to be found in the case of a body of infantry after several hours fighting, yet the defensive powers of this arm are now so developed and perfected, cavalry can cope with it only by attacking in great masses. It can succeed in breaking a line of infantry by giving to its assaults the greatest extent and vigor, and by repeating them again and again. With small effectives this is impossible.

Partial engagements and scattered attacks must be removed from the tactics of cavalry. By concentrating its efforts, all its elements for concerted action and rapid movement, the power resulting therefrom and the moral effect, courage and audacity, will be combined to offset the means of defense which have, in such liberal measure, been placed in the hands of the infantry of to-day.

Doubtless attacks against an infantry not already shaken by a frontal attack, place cavalry in the most unfavorable situation, but nevertheless, if it wishes to do its duty it must resolve to attempt them. Its chances of success will be increased if great forces are used, disposed in several extensive echelons and acting in convergent directions. What will be the result? We shall attempt to depict it. The infantry will receive the first line with calmness, but it will, to some extent, draw in its scattered skirmishers, abandoning the most exposed points in order to concentrate upon such parts of the field as offer the most shelter. When the lines of cavalry which attack in front are extended there will be no opportunity to group fires on the assailants. Each group will be exclusively occupied with the cavalry in its immediate front. The first line of the cavalry will, beyond a peradventure, be decimated. If the horsemen are animated with courage and ardor, some fractions, some isolated elements, of the organization, will succeed in reaching the position and will pass through the gaps produced by drawing in the skirmishers.

If a second echelon follows the first, its advance will be partially sheltered by the line in front of it; it will, consequently, be nearer

the enemy at the moment when his fire is turned directly upon it; the peril of their situation will be more menacing, more real to the enemy's troops, and their fire will become wilder and less efficacious. Now let us suppose that the thunder of the charge is suddenly heard on their flanks and rear, that the struggle is begun in these directions also, that the continually increasing volleys of the supports and reserves indicate that the condition of affairs is becoming serious. Under these conditions any troops, whatever may be their quality, will find their attention partially drawn away from the attack in their front by the combat in progress on their flanks and rear. Some will endeavor to see what is going on at these points. Then, some seeing themselves threatened by small bodies of cavalry which have penetrated into the interior of the position, will direct their fire at these enemies. A change will have come over the former steadiness of the defenders. Certain groups, at a given moment, will believe that their position is not sufficiently secure, and they will endeavor to reach others that will suit them better. This will be the beginning of some confusion.

In the midst of the confusion and tumult, with the peril of death and defeat impending on all sides, it will not be strange if the instinct of self-preservation does not reassert its inherent sway over the minds of many of the combatants. Here and there the devotion, vigorous action, and example of the officers, will be insufficient to keep the men to their duty. The control of the fire will escape from their hands. It will become precipitate and disorderly, and will be divested of that discipline which is its chief reliance. Thus, if regardless of their losses, successive echelons of cavalry continue, with invincible energy, offensive movements directed at the front and flanks of the position, it will often happen that little more will be needed to heighten the sentiment of hesitancy and doubt which has taken possession of some of the troops, that all coolness will be lost, and that individual soldiers will leave the lines to seek safety at the rear, and that this will soon become so prevalent as to produce a partial or general disorder and a paralysis of the defence.

In all these contingencies how many opportunities will be afforded for the action of bodies of cavalry successively supporting each other? How many causes may enhance its morale, and increase the probabilities of its success? If the attacks in front are repulsed, those on the flanks may succeed. If the first echelons acting in either of these directions should fail, those following may succeed in breaking through the position, disorder and confusion are carried into the enemy's ranks, causing a disorganization of the defense, and the desired result is obtained. These grand charges of cavalry will pass over the field of battle like a tempest, overthrowing and destroying all in its path, and leaving everywhere, disorganized fragments which can only with difficulty be rallied and reunited.

Of such a nature would have been the result at Woerth if our brave cuirassiers had not been led directly upon impassable obstacles, and troops sheltered by hop yards and vineyards enclosed by fences. The results of this splendid effort were absolutely and necessarily

valueless because the objective could not be reached. Similarly at Gravelotte in the memorable charge of the Third Lancers and the Cuirassiers of the Guard, if, instead of merely a half regimental front, upon which the entire fire of the enemy was concentrated, the line of cavalry had had a front equal to that of the infantry which it was to charge, and if this powerful effort had been several times repeated by other lines of the same strength, the result would have been very different.

The arguments that may be brought forward in opposition to the probability of events occurring in the manner described, are familiar to all. The first to suggest itself to the mind is, of course, that the infantry has such great confidence in the efficacy of its fire as to remove from it all fear of being overwhelmed by any charge of cavalry; that in this feeling it will find the morale necessary for the preservation of its coolness and equanimity in the midst of charges of the cavalry, however often they may be repeated, and whether directed upon the front or the flanks. This argument is of undoubted value, and this feeling of confidence is one with which every body of infantry ought to be inspired. It will constitute one of the greatest sources of its strength, of its noblest qualities. But, for analogous reasons, the cavalry, on its part, must not consider itself powerless when confronted by any of the duties which it has to fulfill in war, and among these duties will certainly, at times, be found, that of attacking unshaken infantry. If it is to attempt this, it ought to do so with the certainty that the task is not beyond its strength, and that success will crown its endeavors. Let each have its own peculiar and inherent sentiment. The infantry, an invincible confidence in its defensive power as opposed to cavalry. The cavalry, the audacity and boldness requisite for attempting, at times when the interests of the army demand it, to overcome all the resistance of which infantry is capable.

To attempt such enterprises, great resources are necessary. Attacks of this nature must be executed with the greatest forces that can be obtained. One, two divisions, more even, must be launched into the charge. This will depend upon circumstances and the object desired. In any case there will be a force required capable of occupying all the front of the attack and of acting simultaneously and effectively on one or the other exposed flanks; a force sufficient, in short, to form, in each direction of attack, two or three echelons at least.

We have striven to place before the reader this comprehensive and faithful picture, drawn by a master hand, and which, considering its source, has to a certain extent the stamp of authority, because it sums up in a magnificent synthesis the views of all the partisans of charges by great masses, and also because the author, without suspecting it, has furnished the most effective argument that can be brought forward in opposition to them. In fact, alone among all the writers who have discussed this much mooted question, he admits that the infantry

will find in the efficacy of its fire arm, the coolness and equanimity necessary for the successful resistance of several simultaneous attacks, on its front, flanks or rear.

This admission of itself, is enough to prove the fatuity of cavalry charges; for, if this confidence in his arms and its tremendous effects really exists in the mind of the marksman, he at once recovers his moral force and, as a result, the superiority of fire indicated by the trials of the rifle range. Now these trials have proved that the superiority of the small caliber rifle is so great that all examples of the past, whether derived from the campaigns of HANNIBAL in Italy, from the wars of FREDERICK or from those of NAPOLEON, have not the least value.

The following are some of the results obtained by Colonel LEBEL at the trials held at the camp of Châlons: Ten soldiers of the One Hundred and Sixth of the line, *selected at random*, each fired at two hundred yards, with the rifle of the model of 1874, bayonet fixed. The results were fifty hits out of one hundred shots fired.

The great superiority of the 1886 rifle in the particular case of firing with the bayonet fixed is to some extent due to the more accurate construction of the arm, but particularly to the position of the bayonet in the plane of fire, and its lightness. This simple improvement causes half the bullets to strike the mark.

Now when the mark is a line of cavalry, if it receives a single discharge at the distance of 200 meters, will a single trooper remain unhit? It will also be remembered that at the same distance the tables of fire of the rifles of 1886, with bayonet unfixed, give sixty-two per cent. as the probable result of collective fire on lines of cavalry in double rank. "But," it may be said, "cavalry will oppose to the power of infantry fire, first its mass and afterwards its audacity and boldness; for it must not neglect any of the duties which it ought to perform in war." Yes, but the performance of that duty must not be impossible.

We will admit the reasonableness of this opinion when it shall be satisfactorily proved that audacity and boldness will enable a cavalryman to gallop through a stone wall. "Well," the reply is, "instead of one cavalryman, we will use ten, a hundred. But the wall will not stir. We will attack it on all sides at once, we will return to the charge 10,000 strong, and continue our charges without respite and it will be compelled to yield."

The eighty squadrons of MURAT, which rode down the Russian lines at Eylau, would not now reach their opponents any more than if they found in their front a ditch two meters deep and four wide. Moreover, do you not admit this when you say, "Of such a nature

would have been the result at Woerth if our brave cuirassiers had not been led directly upon impassable obstacles?" We place before the cavalry, as impassable obstacles at 200 meters distance, sixty-two hits to the hundred shots, and at 100 meters, sixty-four shots. "We shall try to see what will be the course of events as viewed from our standpoint. Let us suppose that a battalion in battle formation has been attacked by cavalry before the supports and reserves have been able to join the firing line. We will also suppose that the firing line is composed of half the total strength of the battalion, or 300 skirmishers, and that firing is begun at 500 meters.

The line of cavalry will have a front of 300 meters, since it must equal the infantry in this regard; this front is that of a battalion in battle formation; the cavalry will then advance with 300 men in first line, riding boot to boot. Whatever the speed, we will be decidedly within the limits of practice, if we suppose that but one shot is fired while the cavalry is advancing over each space of 100 meters. We will then fire four shots at least. The two last discharges at 200 and 100 meters will of themselves be enough to disable almost all your men, and while the remainder are passing over the last 100 meters we will give them two shots from the magazine. As for the troopers who may attempt to rally on our flanks, they will be obliged to file off through our fire, for they cannot think of retracing their steps; the second line is advancing only 200 meters in rear of them. But for some time the empty spaces in the first line have permitted our bullets to pass through, and although you claim that the second line will still be intact when it reaches a point 200 meters from its objective, yet our opinion is that it will have been severely shaken at the moment when it is unmasked and finds itself face to face with the infantry.

I do not speak of morale; in spite of the audacity and boldness which animate them, it is easy to comprehend that the sights before them will have produced powerful emotions in the stout hearts beneath the cuirasses. It is probable that no small degree of hesitancy will result, to which will be added the difficulties in the path due to the dead and disabled men and horses of the first line, as well as to those men and horses who have not been struck, and are endeavoring to escape in all directions.

During this time the supports will have joined the firing line, our infantry is intact, and its confidence has been redoubled at the sight of the crushing effects of its fire. It will continue to shower bullets on the second line with almost mathematical precision. On the flanks and in rear the results will be about the same. At the first threatening

movement of the cavalry, if it is a regiment on one of the wings which is charged, the battalion placed on the flank will refuse its flank company, which, with the other reserves, will form a line compact enough to defy any attempt on its rear. In this formation the regiment will await your attack without fear; you may advance in several lines, as the French tactics prescribe, or, following the new German method, your main attack may be made by the first echelon reinforced by detachments from the two others, and if you persist in charging, regardless of results, whatever may be your strength, your losses will be so vast, that he will be a bold man indeed, who, in any succeeding war, will attempt to prove a theory by repeating your experience.

And, are you quite sure that you will be able to concentrate your mass of cavalry at the opportune moment at a designated point?

We will take the case of a regiment of infantry posted at the extremity of the line as the most probable one. It will have two battalions in line and one in reserve. Two battalions in line take up 700 meters of front. The reserve battalion may be put in double rank to receive cavalry or may form company squares. We will assume that in either of these formations it will occupy 300 meters. The complete deployment of the regiment, to the front and flank, will then occupy one kilometer. The charge being made boot to boot, one file to the meter, there will be required 2,000 troopers merely for the first line, and for all three, 6,000. Add to this four squadrons on the front and two on the flank as reserves, we reach a total of seventy squadrons. This force though large, is not extraordinarily so, and during the Napoleonic epoch, much more considerable masses were employed.

Our organization provides for no more than two independent cavalry divisions, or forty-eight squadrons, for an army of five corps; if to these squadrons be joined the forty of the corps cavalry, we obtain a total of eighty-eight squadrons. Since at least seventy of our squadrons are needed for the charge on the wing, we shall have only eighteen left for the corps of the army, or less than a regiment for each. Unless the results to be obtained are of such a nature as to require all the disposable cavalry to be used, will it be expedient to thus deprive each corps of half its cavalry, especially in these times, when this arm is more than ever necessary for the minor operations of war?

We will suppose that all the cavalry will be employed in making this exceptional effort, for which you say two divisions and more are necessary. Where will you post such a mass? Will it be divided into several detached bodies on your line of battle, which will be

more than twenty kilometers in extent? At St. Privat the front of the Prussians was nineteen kilometers long. How will you concentrate it if an opportunity offers for a charge on one of the enemy's wings? If you hold it massed at one point, where will this point be? In the center or behind a wing? If it should be far from the point where the necessity for its action is developed, the time requisite for moving such an immense mass, for the maneuvers in connection with the formation for the attack, will be such that the opportunity for its advantageous employment will have vanished.

How will you maneuver such a force of cavalry and, at the same time, conceal it from the view of the hostile artillery, now so efficient both as regards extreme range and accuracy of fire? Lastly, seven or eight thousand horsemen are not maneuvered on the field of battle without great risk of impeding and obstructing the movements of the other arms. On August 18, 1870, the First Division of the Prussian cavalry and the Ninth and Fifteenth Hussars obstructed the defile to the east of Gravelotte to such an extent that their artillery could not take up a position on the right bank of the Mance. The accounts of the German staff show that the defile was, for a long time, completely obstructed by the cavalry.

CHAPTER X.

We have, hitherto, in our discussion, assumed that infantry tactics have undergone no change; that the troops engaged derived no protection from cover, either natural or artificial, and that the action is concluded before nightfall. But we know that these conditions will not hold good in the wars of the future. Owing to the overwhelming power of the fire of the newly invented arms engagements will last several days, and the defense will, from the earliest period of the battle, invariably have the advantage.

Only by dint of successive, long, and laborious efforts, and by taking advantage of the accidents of the ground, and also of field works, will the attacker succeed in even approaching his objective. The armies will be, as it were, nailed to the ground, and the final success will result in favor of the army having the greatest tenacity and the greatest energy remaining after a long succession of partial engagements. No longer will the battle be terminated, as in the past, by a general attack, in which the cavalry, by a prompt, opportune and resolute charge, decided the fate of the day, or by sacrificing itself; saved the army from a humiliating rout. Modern fields of battle will be cut up by field-works and long systems of trenches which will render them impracticable for cavalry. The fire of artillery and

infantry being smokeless, the commander can no longer give to his cavalry a distinct and unmistakable point of direction, without which it will surge about here and there and lose its cohesion,—which is the secret of its force.

The combat of cavalry against infantry will, therefore, be very difficult both in inception and control, and the mass once launched in the direction of the axis of the charge, it will be subject to almost certain ruin; for if the chief attempts to check its mad charge and move it to the rear, its own inertia will carry it on to a ruinous contact with its antagonists.

But, will the capabilities of cavalry be restricted as a result of its inability to charge infantry? Certainly not. No more than the other arms can cavalry expect to escape the process of transformation which science has caused in all branches of the art of war. But only by renouncing its ancient methods, however much they may have contributed to the establishment of its glorious traditions, and by entering boldly and without chimerical regrets upon the roads which the infantry and artillery are now treading, can cavalry hope to see its mission enlarged and a new horizon open before it.

Cavalry alone, by the rapidity of its movements, can surround a column in march, and overwhelm it with its fire, without showing itself. Cavalry patrols alone, for the same reason, are able to rush at full speed upon the enemy's outposts, and collect the information which hitherto, only the smoke and report of the fire-arms used have revealed to the eye and ear. The charge of grand masses is a thing of the past, and in its stead, is substituted an individual charge, the elements of which, by taking advantage of the accidents of ground and the swiftness of the horse, may succeed in passing through the meshes of the protecting net which their adversary has thrown around himself, and, in many cases, may dismount and engage his infantry with its own arms. Far in advance of its own army, alone, or in connection with the other arms, it will put in a state of defense, defiles, bridges, fords, etc.; it may, thanks to the efficiency of its arms, acquit itself well in the most obstinate combats; often it may retard the advance of the enemy and prevent the guns of his advance guard from coming into battery.

In the protracted and severely contested battles of the future, cavalry will obtain results of the greatest importance by moving in great masses on the flanks or rear of the enemy, and often by fighting on foot. Its mobility and rapidity of movement will enable it to attempt concerted attacks on different points, and to threaten the enemy's line of retreat, and this, with the most favorable effect. Whenever

the presence of infantry is needed at a point so distant that it cannot be reached without subjecting it to great fatigue, cavalry can be substituted with great advantage. It will repair to the place with celerity and will create a diversion as efficacious as any that it could hope for from any charge, for which, during long and anxious hours, it awaits the opportunity that never comes.

History furnishes many examples of the use which enterprising and energetic leaders have been able to make of cavalry, both mounted and on foot. During the battle of Spicheren, the brigade Valazé having been ordered away by General FROSSARD, Lieutenant-Colonel DULAC was left at Forbach with two squadrons of the Twelfth Dragoons, a few engineers and 200 reserve soldiers of the Twelfth of the line. The head of the Thirteenth Prussian division coming from Klein-Rossel and advancing on Spicheren, passed close to Forbach. From this point it received so destructive a fusillade that it had to use its artillery and make a serious effort to dislodge this weak force, of which dismounted cavalry composed the major part. Being finally compelled to abandon his post after a vigorous defense, Colonel DULAC, though almost surrounded, ordered his dragoons to mount, and, favored by the increasing darkness, charged upon the enemy and disengaged his force, but with a loss of four officers and twenty-five men.

A number of examples might be cited in which cavalry has been able to utilize its fire and withdraw quickly at the exact moment when its object had been attained, or at a moment when the superiority of the enemy exposed it to a danger from which no infantry could have escaped.

Lastly, does there still not remain to cavalry, in its extensive movements in reconnaissance and on the battle-field, the combat with its rival, the cavalry of the enemy, the imposing and chivalrous hand-to-hand conflict which, for all time, has been regarded as the most splendid and most noble incident of war.

Such an encounter was the sanguinary and stubbornly contested cavalry duel at Essling, of which THIERS in his "Consulate and Empire," gives the following account:

Upon our center the storm seemed about to burst, for the corps of HOHENZOLLERN, the grenadiers, and LICHTENSTEIN's cavalry advanced towards it in a compact mass. NAPOLEON perceived their design and sent intelligence of the movement to LANNES who had also become aware of the Austrians' intentions; the Emperor and the Marshal warned the division of SAINT-HILAIRE, the divisions of OUDINOT and the cavalry to again sacrifice themselves for the salvation of the army.

LANNES placed the divisions of SAINT-HILAIRE, CLAPARÉDE and THARREAU in the first line; the cuirassiers in the second line; in the third, the Old Guard. He permitted the dense mass of the corps of HOHENZOLLERN and the grenadiers to approach to half musket range and directed upon them a fire of musketry and grape of such precision that the ranks of the enemy were perceptibly thinned. He then launched the cuirassiers at top speed upon the Austrian infantry, which gave way at several points, and its close array was broken, as a breach is made in a wall.

Prince JOHN OF LICHTENSTEIN in turn brought up his cavalry and charged that of BESSIÈRES. LASALLE and MARULAZ advanced with their chasseurs and hussars to the aid of our cuirassiers, and the vast field soon presented the singular and dreadful spectacle of an immense crowd composed of fifteen thousand horsemen, Austrian and French, furiously charging upon each other, united as they advanced, dispersed as they returned, and ceaselessly rallying to charge anew.

After the termination of this prolonged and desperate hand-to-hand conflict, the movement of the enemy on our center was definitely suspended, and the corps of HOHENZOLLERN was brought to a stand in front of the epaulement extending from Essling to Aspern.

Of the same nature was the cavalry encounter at Rezonville, on the plateau of Ville-sur-Iron, where 5,000 troopers rushed upon each other with the greatest impetuosity. This combat, in which, in spite of their bravery, our cavalry had to yield the palm to that of the Germans, cost us the life of General LEGRAND. General MONTAIGU was severely wounded and taken prisoner.

At the time when the enemy was triumphantly pursuing our squadrons, which, at the utmost speed of their horses, were retreating to the village of Bruville, an event took place, which, now that our troopers are provided with a carbine of a small caliber, has a significance which entitles it to a serious examination.

A few scattered squads of the Second Chasseurs d'Afrique, which had taken part in the action, having dismounted, threw themselves into the little wood of Ville-sur-Iron and opened fire upon the German cavalry. A few French skirmishers from an ambush in the valley of the farm of GRÉYERE did likewise, and the victorious cavalry which had just sustained a violent struggle with three hostile brigades, was compelled to discontinue the pursuit and return to its lines, unable to endure the fire of a few troopers whom it had dismounted. This fact is interesting because it brings into opposition the two modes of action of cavalry, according as it fights on foot or on horseback, and because the troops used both methods in the same combat.

These same troops, without in the least suspecting it, have solved the problem which, at this very moment, is perplexing so many emi-

nent minds, and it is in conformity with the dictates of sound judgment; it is that in proportion as the preponderance of fire-arms is increased, the employment of other arms is diminished. This is a law which has long been following its regular course. The struggle between the bullet and cold steel does not date from to-day. Fire-arms remained stationary for centuries, but they have at last, resumed their march, and are advancing with giant strides. At each stage some one of the accessory arms takes its place in the museum of antiquities. All of them are there now or soon will be. The lance, which some are endeavoring to introduce, and the saber itself, will, in the near future, peacefully repose on the walls of our arsenals beside the battle axes, the halberds and the armor of our ancestors; and this will come to pass on the day when our troops shall have learned to use their musketoon on foot and on horseback.

This at first sight will seem to partake of heresy, and will doubtless exasperate in a high degree those cavaliers who consider any method of fighting other than that with the saber and lance as unworthy of the glorious traditions of their arm. We respect these illusions; they are the last vanishing rays of light shed by the past; but at the same time we will ask these partisans whether they consider it impossible for a troop of cavalry, even at the risk of seeing its name nailed to the pillory of the glorious history of this arm, to refuse the duel with the saber, and instead, to dismount and attack its rival with its fire-arms.

A division of cavalry can put 2,000 troopers in line, reserving 400 for holding horses. This is almost the effective strength of a regiment of infantry, and we claim to have proved that no force of cavalry, no matter what its strength, can hope to attack such a force with reasonable prospect of success.

As for firing from the horses' backs, which was generally condemned when attempted with the fire-arms formerly in use, it now seems to be entirely practicable with either the Lebel carbine or the musketoon. The discharge of these arms being accompanied by neither smoke nor report, the horse does not become frightened as was formerly the case, and the rider can aim better. In short, it is only a matter of drill for the men and of training for the horse. Of course this fire can never be compared to that of a body of infantry, but results may be obtained which are not to be despised. A troop of cavalry coming up at a gallop, suddenly halting and opening fire on its adversary and then moving on again at the same pace, will produce an effect not to be despised.

We think that if any cavalryman is permitted to choose between

the lance and the Lebel musketoon, he will not hesitate to take the latter, which is a lance two thousand yards long. What limit is there to the power of two thousand vigorous men, who, by virtue of the rapidity of their movements, may make their presence severely felt almost simultaneously on different points of the battle-field, while the infantry is more than ever, as it were, chained to its position? But, it will be asserted, you are not describing a cavalryman; your creation is only that hybrid being, the mounted infantryman. A cavalryman does not cease to be a cavalryman, if, by stress of circumstances, he is compelled to leave his saber in the scabbard and use his fire-arms. Whether he be styled a dismounted cavalryman or a mounted infantryman, he none the less represents by the rapidity of movement due to the horse, and the power due to his carbine, the most perfect union of force and swiftness.

The ancients, to give a concrete expression to this idea, created the Centaur, armed with a bow, which was their most perfect missile weapon. Some have thought that if the lance be restored to the trooper, he will be endowed with a shock power of the highest order. Such might have been the result some years ago, but now that smokeless powder has been adopted, it is a profound error, for there is now no such thing as shock action, at least against infantry.

An attempt to justify the change is made by asserting that the lance shall be used only against cavalry, for as foreign cavalry still use this arm, it is absolutely necessary to meet it with the same kind of weapon. Let them cite an example in which two bodies of cavalry have charged home on each other and an actual shock resulted. The rule, based on experience, requires that when the lines are about to join, each man shall select a particular opponent, and attack him. This is not a shock, but a hand-to-hand encounter. The shock is proportioned to the mass and to the square of the velocity. Then whether the trooper has a lance, a saber, or nothing at all, matters little. The shock will take place in exactly the same manner, and with the same living force.

In the hand-to-hand conflict the saber finds its true place, and the lance can be of no real use. Certain partisans of the lance have proposed to arm the front rank with this weapon for the shock, and the rear rank with the saber for the *mêlée*. Any one can readily comprehend the situation of the wretched lancers with their long poles in the midst of a furious hand-to-hand conflict. We regard the timid and temporizing resurrection of the lance as one of those retrograde movements which are natural to the human mind, and which, al-

though they may obstruct the pathway of progress, can never close it entirely.

In the physical as in the moral order of things, equilibrium takes place only after a number of oscillations. The waters of a majestic river strive to combat with the rising tide. For some moments they appear victorious; but soon the rising wave triumphs over all obstacles and overthrows everything in its front. The sight of our brave dragoons returning from a drill, awkwardly holding their lances—for years of instruction are necessary to make a good lancer—call to mind the story of DANIEL ROCK and his sons CHRISTIAN and KASPER.

The heroic smith, a determined enemy to progress, has sworn that he will stop the first train that attempts to pass over the railway just constructed in the village. As the train approached, old DANIEL ROCK and his sons, each armed with an immense pike, were seen advancing from out the dim depths of the tunnel. The locomotive came on like the wind. Half a minute more and it would pass over their bodies and plunge into the mountain. The old smith stood on the track, between his sons, head erect, pike in his right hand, his brows contracted, his lips compressed, and his great aquiline nose standing out like an eagle's beak. He gazed on the approaching train with an air of defiance and seemed to say, "You shall not pass." It was impossible to help admiring his proud attitude. CHRISTIAN and KASPER, one on each side, necks and chests bare, stood as motionless as statues. Suddenly all three bent forward and rested the butts of their pikes on the ground with the points forward. The multitude began to tremble. It was too late to stop the locomotive. The engineer, fearful that the train would be derailed cried in a voice that rose above the thunder of the wheels: "Let her go." The locomotive was immediately covered with a cloud of steam, and rushed into the tunnel with a frightful scream.

When it had vanished from view, all eyes were directed to the spot where a few seconds before old ROCK and his sons had stood. The three smiths and their lances had been crushed like straw, and far in the distance the locomotive could be heard rumbling along with undiminished speed.

NIGOTE,

*Major One Hundred and Nineteenth Regiment of Infantry,
of the former Staff.*

FURTHER REMARKS ON THE CAVALRY FIGHT ON THE RIGHT FLANK AT GETTYSBURG.

TO THE EDITOR:—When the last number (March, 1891) of your JOURNAL reached me a short time ago, I was very much pleased to find in it the admirable address delivered by General KIDD, upon the occasion of the dedication of the monument erected by the State of Michigan in recognition of the services of the Michigan Cavalry Brigade during the battle of Gettysburg. It is eminently proper that your pages should contain the account given by that gifted orator and truth-seeking historian, of one of the most brilliant cavalry encounters which occurred during the War of the Rebellion, and that his valuable work should not remain buried in the pages of a publication which has only a limited circulation. It may be, and probably is, the fact that previous to your publishing the address, but comparatively few of your readers knew or had heard any of the particulars of that brilliant passage-at-arms, which, as some of us modest cavalymen have not hesitated to claim, saved the battle of Gettysburg to the Union cause—or at any rate did much in that direction.

I beg hereby to tender to General KIDD my heartfelt thanks for the kind and courteous manner in which he has expressed himself towards me and my account of the fight. He finds much in which to agree with me, and but little in which to differ from me. This is all the more striking from the fact that when my account of the fight was first given to the public, in September, 1878, in a contribution entitled, "The Right Flank at Gettysburg," published by the *Philadelphia Times*, in its series of "Chapters of Unwritten History in the Annals of the War," and subsequently published in pamphlet form, there was almost nothing in the way of printed material to work upon. The cavalry fight had been *utterly and entirely ignored* by every author who had purported to write a history of the battle of Gettysburg. The publication of the official records of the Rebellion had not even begun. Nothing indeed had been printed but the report of General CUSTER of the services of his brigade in the Gettysburg campaign, which appeared in MOORE'S "Rebellion Record," Vol. 7, page 397—a report so full of errors and so apocryphal that it has not even been given a place in the Gettysburg volumes of the Official Records of the Rebellion recently issued. One

of the earliest publications relating to the matter was that of General J. E. B. STUART's official report, which was printed in the Southern Historical Society's Papers in September, 1879. This, together with all other matters then available, had been kindly placed at my disposal, in manuscript, by the authorities of the War Department. It was no small task, therefore, to prepare an account of a rattling, dashing cavalry fight fifteen years after it had occurred; and any one who has attempted to give a succinct history of anything of the kind, in which everything and everybody is here, there and everywhere a dozen or more times during its occurrence, will bear me out when I suggest that it was no easy task. When my second account of the fight was given to the public, in October, 1884, I then had placed at my disposal the full, but as yet imperfect, advance print of the Gettysburg volumes of Official Records, and I was thereby enabled to make some few slight corrections and additions to the text of my first account.

General KIDD, on the other hand, when he had occasion to prepare his account of the fight, had not only mine to work upon, but also Major H. B. McCLELLAN's, given in his excellent and conscientiously impartial (from a Confederate standpoint) "Campaigns of Stuart's Cavalry;" General TROWBRIDGE's paper, read in October, 1886, before the Michigan Commandery of the Military Order of the Loyal Legion of the United States; the COMTE DE PARIS' account in the third volume of his "History of the Civil War in America," and Captain MILLER's account in the third volume of the "Battles and Leaders of the Civil War," as well as the more completely collated Official Records. I am therefore surprised that he found so little in which to differ from me. To be sure he saw the fight with different eyes from mine, and no two accounts of the same battle written by participants—it may be by those who fought side by side—have ever yet appeared in which material disagreements do not exist.

General KIDD takes exception to what I state in but five instances:

1. That my encomiums upon the part which the Michigan Cavalry Brigade took are perfunctory and not from the heart. God forbid that I should let that rest unchallenged! No one can but acknowledge that that superb command bore the brunt of the fighting; its losses show that. But what I *do* maintain, and have always maintained, is, that some of GREGG's cavalymen were there also, and that General GREGG was in command on the field and entitled to the credit of the victory. Both these facts were for a long time denied by the men from Michigan, and it was not until we met in reunion upon the field and convinced them to the contrary, that they would acknowledge that we were entitled to some recognition.

2. That I stated that CUSTER's brigade spent the night of July 2d in bivouac at "Two Taverns." Well, it may have been late when the men got to bed—or what in those days constituted a bed—frequently the sharp angle of a fence rail—and some may have seen a few streaks of daylight before they turned in, but the majority nevertheless *did* get some rest. I do not think that any of us who might be returning from a ball or other similar dissipation would acknowledge to have been out all night, had we gotten home at the same hour that CUSTER's men went into bivouac.

3. That, according to my account, McINTOSH's brigade of GREGG's Division had relieved CUSTER's, and that the latter had moved off the field. In the light of later testimony I will have to acknowledge that the *whole* of CUSTER's brigade had not left the field. It had, however, "pulled out," and two regiments at least (as General KIDD acknowledges) were in movement to the rear to join KILPATRICK on the right. That, however, the picket lines had been relieved, and that some of McINTOSH's troops had actually taken the places of some of CUSTER's, I have a distinct recollection, and so has every man of my brigade with whom I have conversed upon the subject. This, however, is a very trivial difference.

4. With reference to PENNINGTON's battery being still in position near the SPANGLER house while its brigade had moved off.* This is now easily reconciled with the facts, inasmuch as I have acknowledged that CUSTER's entire command had not left the field when the fight opened. And here I may say that it has always been the recollection of those who served in McINTOSH's brigade, that the fight was opened by the First New Jersey Cavalry advancing on the RUMMEL farm buildings, and since General KIDD maintains that one of CUSTER's regiments did the same, I suppose that this also will have to be relegated to that aggregation of disputed points which bristle up in the account of every encounter upon the whole battle-field.

5. But the only point in which I must take exception to my friend General KIDD is, that he has added a foot note on page 62 of the account as published in your JOURNAL, but which did not appear in the previous issues of the address. He states: "Colonel BROOKE RAWLE gives an exaggerated estimate of the losses, for which there is no verification in the official records." Now I claim that this is not fair. My words were: "General GREGG reported his losses to be one officer and thirty-three enlisted men killed, seventeen officers and one hundred and forty enlisted men wounded, and one officer

*Captain C. A. WOODRUFF, Second Artillery, who commanded a section of the battery in question, states positively that four guns, commanded by himself and Lieutenant HAMILTON, remained in position near the SPANGLER house during the whole battle.—EDITOR JOURNAL.

and one hundred and three enlisted men missing—total, two hundred and ninety-five. CUSTER, in his official report, stated his losses to be nine officers and sixty-nine enlisted men killed, twenty-five officers and two hundred and seven enlisted men wounded, and seven officers and two hundred and twenty-five enlisted men missing—total, five hundred and forty-two." Where are any words of mine? At the time my account was written, the Official Records in the War Department had not yet been collated. I suspected that something must be wrong, yet I had nothing to go upon except the official reports above quoted. No one can but acknowledge that I was non-committal in the statement. I was careful to assume no responsibility in quoting the estimate of losses, especially so in relation to General CUSTER's. General GREGG properly reported all the losses in his command, that is, in the Michigan Brigade, as well as in McINTOSH's and IRVIN GREGG's brigades of his own division. But General CUSTER certainly does state in his report (see MOORE's Rebellion Record, Vol. 7, p. 399) that in the battle of July 3d he suffered the losses as above quoted. Since my address was published, it has been ascertained by the authorities of the War Department that the figures which he gives are much nearer the losses of his brigade *during the entire Gettysburg Campaign* than those of the battle itself.

There is one matter for which I am exceedingly thankful to General KIDD, the second foot note on page 54. At times I have almost persuaded myself that General CUSTER's official report was a romance. Among other things, I have never yet found a participant in the fight who will acknowledge that there was any fighting on the field as early as 10 o'clock. Indeed, I have much affirmative and positive evidence that there was none. The very brilliant suggestion that General CUSTER wrote "1 o'clock" (not long after which time the fighting did actually begin) and that in copying his report the "1" and "o" of "o'clock" were mistaken for "10," reconciled the difficulty in my mind. In my address, however, I gave an extract of that portion of the report for what it might be worth, though I must say that I thought that its author was relating some of the events which we of McINTOSH's brigade had thought that we were responsible for.

And now, if you will accept for publication in your excellent JOURNAL my last, and, I trust, final contribution to the literature of the "Cavalry Fight on the Right Flank at Gettysburg," you will oblige,

Yours very respectfully,

WM. BROOKE RAWLE,
*Formerly Captain Third Pennsylvania Volunteer Cavalry,
Brevet Lieutenant-Colonel, U. S. V.*

PHILADELPHIA, June 3, 1891.

FIRING AT BREAST-WORKS OF SNOW WITH THE BERDAN RIFLE.

IN the months of January and February, the Grenadier Battalion of H. I. H., Grand Duke PETER, went out to the Ochta polygon (firing ground) to test firing at snow breast-works, in order to obtain data from which to determine the thickness of snow breast-works to resist bullets.

In pursuance of this, it was necessary to construct breast-works of different thicknesses; they also differed in the quality of the snow, which was either in a melting, a dry or a frozen state, due to varying conditions. The firing distance varied between 150 and 600 steps, (one step twenty-eight inches).

The first test, that took place on the 23d of January, was made by a detachment of twenty-five sappers who, at 8 A. M., with simple sapper shovels, constructed, at a temperature of freezing, five breast-works of dry, loose snow thrown from the shovel and not beaten down; they were each six steps in length, (Fig. 1).

The first breast-work was four feet thick; the second breast-work was five feet thick; the third breast-work was six feet thick; the fourth breast-work was seven feet thick; the fifth breast-work was eight feet thick. The height in rear was four and one-half feet, in front four feet; the base of the exterior slope was four feet, that of the interior slope one and one-half feet. The work ended at 9 A. M. Behind the works, along the foot of the interior slope, boards painted black were placed. These served as targets, while on the exterior slope of each work was a round paste-board circle representing the bulls-eye. The tests were made with two rifles, and were begun at 9:15 A. M., at a temperature of six degrees above freezing, (Réaumur).

The first test took place at a distance of 150 steps; five bullets were fired into each work. The wind was rather strong and blew from the left side. The result of the firing is shown in Fig. 2.

Four of the bullets, striking the four foot breast-work, passed through it, reached the target, but not penetrating, fell at the foot of it.

Three of the bullets, striking the five foot breast-work, stopped at a distance of four and one-half to five feet.

Three bullets, striking the six foot breast-work, stopped at a distance of four to five feet.

Four bullets, striking the seven and eight foot breast-work, stopped at a distance of five feet.

After this the firing, continuing in the same order, took place from 200 steps.

Results:—Five bullets, passing through the four foot breast-work, struck the target and fell at the foot of the interior slope.

Of four bullets, striking the five foot work, three stopped at a distance of four and one-half feet, and the others, in passing through, fell at the foot of the target.

Four bullets, striking the six foot breast-work, stopped at a distance of five feet.

Three bullets, striking the seven foot breast-work, lay within the limits of four to five feet.

The eight foot one was struck by four bullets; they all stopped at a distance of five feet.

This ended the first test. The general result of the firing was as follows: The four and five foot breast-works should be considered unsatisfactory, as the bullets passed through them (especially the four foot one) striking the target with so little velocity that no traces of the shot could be seen on it.

Six, seven and eight foot breast-works may be thick enough to prevent the penetration of bullets, but only when they are constructed of snow, (soft, but not in lumps), forming a common compact mass. None of the bullets fired lost their shape, and all were found lying perpendicular to their line of flight.

TESTS ON THE 24TH OF JANUARY.

At 8 A. M. the same number of privates constructed in one hour's time, five breast-works of snow; the length of each was six steps. The work was made during a temperature of one degree R. The breast-works were made of the same quality of snow which, for the purpose of giving the embankments a greater compactness, was trodden with the feet and beaten with shovels. The profile and the position of the target and bull's eye remained unchanged. The same rifles and the same number of bullets were employed for the firing, which began at 9 A. M.

Distance, 150 Steps, (Fig. 3).—The five bullets, passing through the four foot breast-work, hit the target and fell without entering it.

Five bullets, penetrating the five foot breast-work, stopped at a distance of five feet. In the six, seven and eight foot breast-works four bullets stopped at the same distance as in the five foot embankment.

Distance, 200 Steps.—The same result as from 150 steps.

Distance, 300 Steps.—The same result was obtained, except that in the eight foot breast-work the bullets stopped within the limits of three and one-half to four and one-half feet.

Distance, 400 Steps.—The bullets passed through the four foot work. In the five and six foot ones the bullets stopped within the limits of four and one-half to five feet. In the seven and eight foot breast-works they stopped at a distance of three and one-half to four feet.

Distance, 600 Steps.—From this distance only the four and eight foot breast-works were tested; ten bullets were fired at each. Seven bullets, passing through the four foot breast-work, were found within the limits of three and one-fourth to three and three-fourths feet. Six bullets, penetrating the eight foot one, stopped at a distance of three and three-fourths feet.

The general result of this firing can be considered as follows:

Breast-works made of melting snow, well trodden, showed that in consequence of increase of both the thickness and distance, the bullet gradually loses its velocity and therefore penetrates the snow mass to a less depth. This is firstly proved by the fact that the four foot breast-work was not penetrated by the bullet at a distance of 600 steps, and secondly, by the fact that in the eight foot breast-work the bullet stopped at a thickness of from three and one-fourth to three and three-fourths feet.

TESTS ON THE 27TH OF JANUARY—(FIG. 4).

For this test the breast-works were constructed two days earlier at a temperature of $+3^{\circ}$ R. in order to give the snow mass a greater compactness and time to freeze. On the eve of the 27th of January the temperature fell to -7° R.; the tops of the breast-works were frozen, forming a crust six inches thick. The profile of the works remained unchanged. The test began at 9 A. M., at a temperature of -5° R.; five bullets were fired at each breast-work.

Distance, 150 Steps.—Into the four foot breast-work, four bullets penetrated a distance of three and one-fourth to three and one-half feet; in the six, seven and eight foot breast-works, four bullets penetrated a distance of three and three and one-fourth feet.

Distance, 300 Steps.—Into the four, five, six and seven foot breast-

works the bullets penetrated a distance of three to three and one-half feet. In the eight foot one the bullets penetrated the embankment to a distance of two and one-half to three feet.

Distance, 600 Steps.—Into the four and five foot breast-works the bullets penetrated a distance of two and one-half to three feet. In the six, seven and eight foot ones they penetrated a distance of two and one-fourth to two and three-fourths feet.

The general results of the firing on the 27th of January can be summed up as follows: Breast-works constructed in time to allow them to freeze exteriorly and become compact inside, weaken the velocity so much that in such conditions breast-works four feet thick can be considered as satisfying all requirements.

TEST ON THE 7TH OF FEBRUARY—(FIG. 5).

At 2 p. m. the 6th of February, at a temperature of -6° R., the following three breast-works were made of dry snow:

1. A breast-work four feet thick, four and one-half feet in height at the interior and four feet at the exterior ridge; the base of the exterior slope was four feet.

2. A breast-work eight feet thick, of the same height as the first; and

3. A glacis to which the following profile was given: Thickness, two feet; base of the exterior slope, fifteen feet; of interior slope, two feet; height, four and one-half feet; exterior ridge, none.

At 5 o'clock in the afternoon of the same day all the breast-works were watered and left to freeze.

On the day of the firing (7th of February) the temperature was -6° R.; the tops of the breast-works were covered by a crust of ice two inches thick, while about two inches below this crust the snow was merely frozen, forming a porous mass like a sponge.

Distance, 100 Steps.—Five bullets penetrated the four foot breast-work to a distance of one and one-half to two feet. In the eight foot one the bullets entered to a depth of two to two and one-half feet. The glacis was struck by five bullets, of which two ricocheted on the exterior slope and passed over the target; the other three, penetrating the crust, were found in the thirteen foot line of the embankment.

Distance, 300 Steps.—The four foot breast-work was struck by four bullets which stopped within two to two and one-half feet. In the eight foot one the bullets passed through the embankment and lodged at a distance of one and one-half to two feet. Of five bullets which struck the glacis, three, in ricocheting, passed over the target,

General view of Crest-Work
with the targets in rear.

Fig.1.

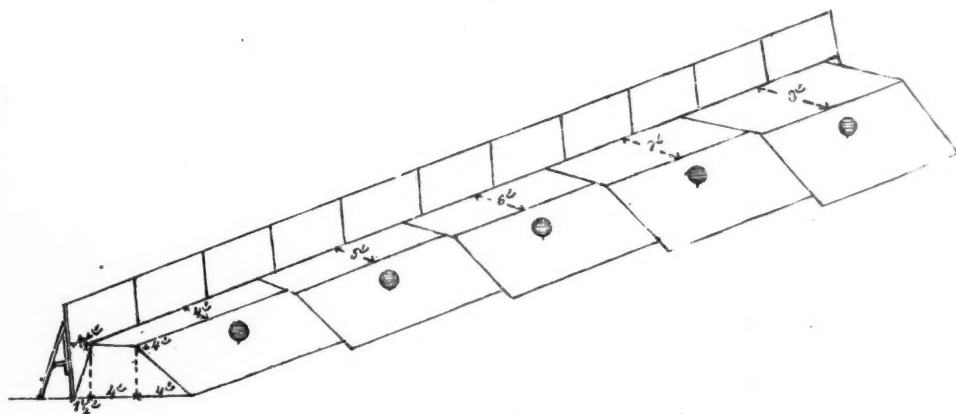


Fig. 2.

24 January
Distance 150 & 200 Steps.

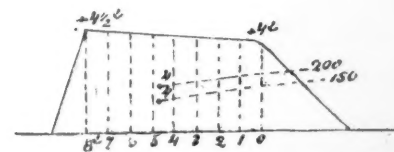
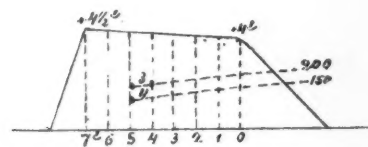
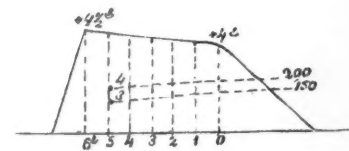
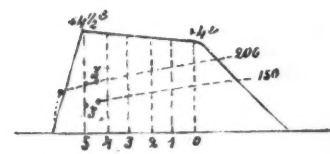
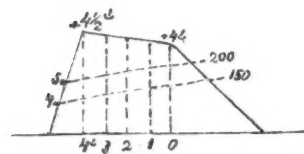


Fig. 3.

24 January
Distance 150, 200, 300, 400, 151.2

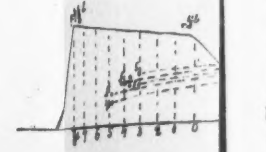
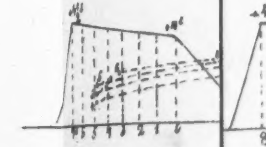
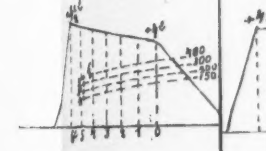
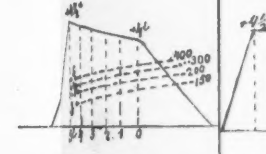
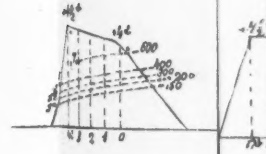


Fig. 2,

24 January
Distance 150 & 200 Steps.

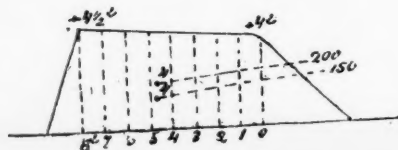
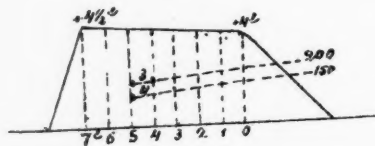
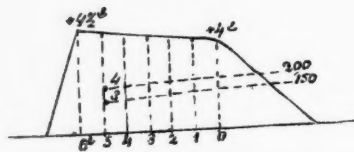
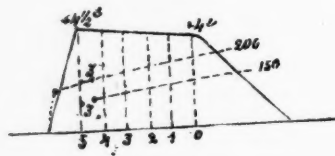
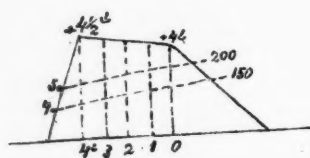
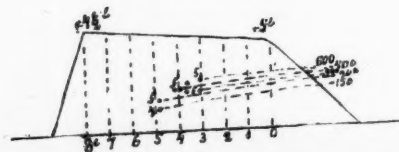
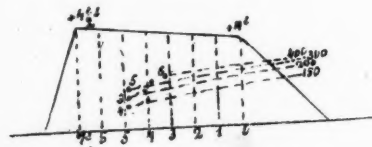
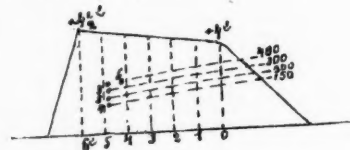
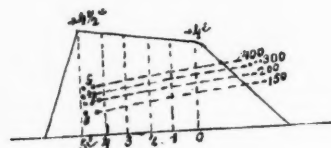
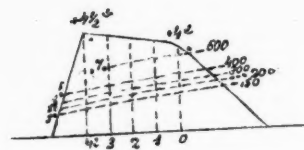


Fig. 3,

24 January
Distance 150, 200, 300, 400 & 600 Steps.



Work

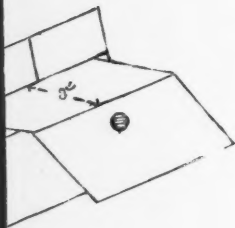


Fig 4.

27 January
Steps. Distance 150, 300 & 600 Steps.

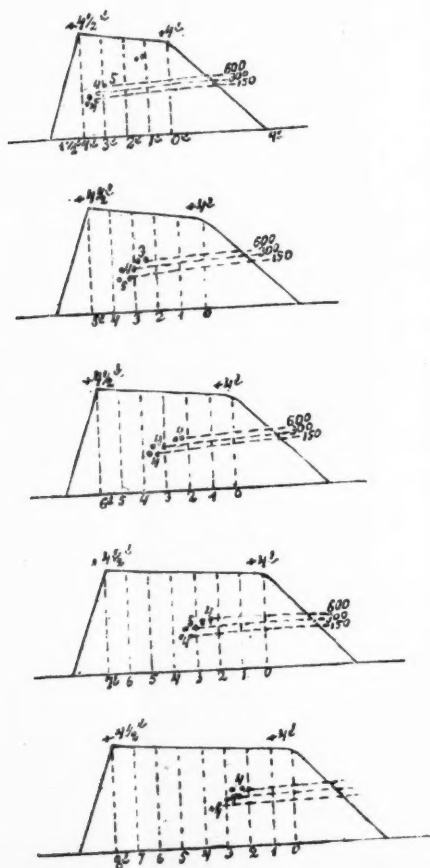
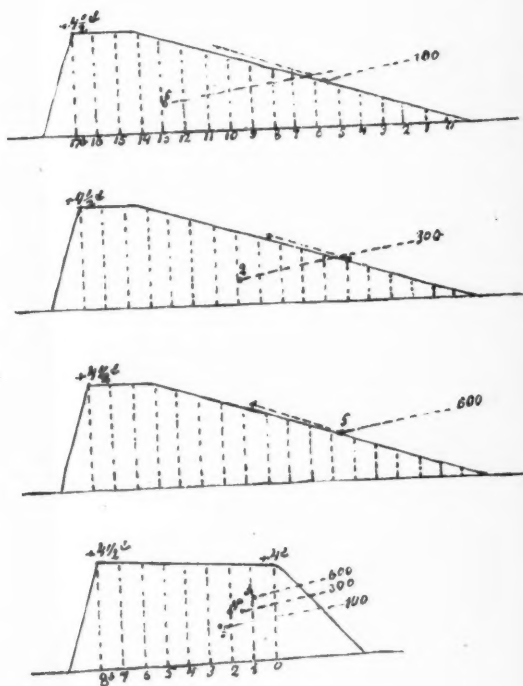


Fig 5

7 February
Distance 100, 300 & 600 Steps.



Feet 43819 4 8 Feet

while the others, breaking through the crust, stopped at the ten foot line.

Distance, 600 Steps.—The bullets passed through the four and eight foot breast-works and penetrated to a distance of three-fourths to one and one-half feet. Of five bullets which penetrated the glacia, two making a ricochet along the slope, passed over the target, the third, also ricocheting, passed through the target, and the rest, breaking through the crust, fell at the five foot line. With this the tests ended.

In making a general resumé we may come to the conclusion that a breast-work six feet thick, constructed of melting snow (directly from the shovel) can be considered as satisfying all requirements. If the breast-work be made of the same quality of snow, but pressed with the feet and shovels, then such an embankment of a five feet thickness can be considered satisfactory. A work constructed of the same snow frozen at the top can also be considered satisfactory even with a thickness of four feet. A breast-work three and one-half feet thick, (watered from the top) with an ice crust at the top, at least two inches thick, can also be considered satisfactory.

The tests showed that glacia are the best for the firing from different distances. Some of the bullets striking the exterior slopes ricochet, leaving only shallow furrows, and pass over the embankment; others, however, passing through the crust, soon lose their velocity and penetrate an insignificant distance. It was observed in firing at the glacia that all the bullets were more or less deformed; in the four and eight foot breast-works the bullets were also flattened, but not to such an extent as in the first case. For the above tests three hundred and three cartridges were employed.

A. H. KOVRIGIN.

ST. PETERSBURG, April 4, 1891.

SOME THOUGHTS ON EQUIPMENT.

OUR cavalry owes its origin to the necessity of giving protection to the pioneers of western civilization. Its development has been, generally speaking, controlled by the peculiar conditions incident to warfare in wild and desolate regions, with savage tribes, skilled in all the arts of treachery and stratagem; and the qualities of independence and self-reliance have been, through these agencies, indelibly stamped upon its character. The Mexican War was an episode which marks an important stage in its development, while the four years of the Rebellion period demonstrated the value of its previous education and training, and confirmed and established for all future ages its distinguishing characteristics. Its progress since the war has consisted chiefly in the improvement of its armament and equipment; the organization having remained the same, except the attempted assimilation to infantry, which has thus far proved to be injurious rather than advantageous.

The armament of the American cavalry was determined by the character of its early service. The absolute independence of its operations rendered the best fire-arm obtainable a necessity, and in the days of percussion caps and muzzle-loaders no difference of opinion existed with reference to the value of the saber as a weapon always to be relied upon. The experience of the Civil War demonstrated the fact that neither the saber nor the carbine is the distinctive cavalry weapon, but that they are both equally necessary to its efficiency. The just renown of the cavalry of the Western armies is based not upon its many victorious encounters with the bold horsemen of MORGAN, FORREST, and WHEELER alone, but in an equal degree upon its splendid dismounted fighting at Nashville, West Point, Macon, and on other bloody fields. By the troopers who fought with SHERIDAN, the memories of Cold Harbor, Deep Bottom, and Five Forks are cherished no less proudly than those of Yellow Tavern, Winchester, and Tom's Brook.

The idea that his was a superior arm, to be escorted and protected by the infantry, and reserved for special and distinguished service at

some crisis of the battle, had no place in the mind of the cavalry soldier of the Union armies. He understood thoroughly that the requirements of war demanded that he should be prepared to meet the enemy with courage and effect in whatever shape encountered, and no defects in tactics or equipment were permitted to swerve him from his soldierly purpose. His intolerance of the unpractical or sentimental in equipment was evinced in the ridicule with which he greeted the appearance of the lance. The few organizations which ventured to carry this weapon in the early days of the war were hooted and gobbled at till they were glad to exchange the stylish lance, with its glaring red pennon, for the more practical and less pretentious saber. The fact was appreciated, that whatever value the lance might possess as a charging weapon, it tied the trooper to his horse, and thus impaired that independence of action so essential to his efficiency.

The equipment of our cavalry, to-day, is probably not excelled by that of any other nation in the world. Changes have not often been made, or improvements adopted, before being subjected to the test of actual work in the field, and then only after long and persistent battering against the walls of conservatism which surround the department of manufacture and supply. Our advance has thus seldom kept pace with the onward march of the age, and it is only by unwearied and constant thought and attention on the part of cavalry officers that we can hope to reap for our arm the benefits which are rendered possible by the increased skill and improved methods which are every year apparent in the mechanical arts.

It is always easier to point out defects than to correct them; to indicate what improvements may be desirable than to devise practical methods by which they may be attained. I am well aware that my opinions have more value in my own estimation than they are likely to have elsewhere; and in placing them before the Association I have no desire to be obtrusive. Improvement is, however, impossible without interest and discussion, and if the crude and undeveloped ideas which follow contribute in any degree to this end they will not have been recorded in vain.

The Springfield carbine has served its purpose, and we can afford to wait with patience for the result of the labors of the Small Arms Board now in session, feeling confident that it will give us the most effective weapon which the progressive spirit of the age can produce. The target practice work of the last few years, has, it is believed, prepared us to accept cheerfully an increase of two or three inches in the length of the barrel, if thereby additional range and penetration

can be secured; and we will also hope that a rear sight may be devised which will not require both hands for its adjustment, and which will be better adapted for the serious work of the battle line.

The adoption of smokeless powder and a magazine gun of reduced caliber will naturally involve a pistol of improved pattern. Unfortunately opinion is divided concerning the uses of the pistol and its value as a weapon. This is not a proper occasion for a renewal of the old controversy of the pistol versus the saber; nevertheless, it would seem that those zealous advocates of the pistol who believe that it should take the place of the saber, as a charging weapon, and that more conservative class which believes that it should continue to hold the place which it has heretofore filled, that of a supplementary arm, serviceable for couriers and patrols, and useful in the *mêlée*, might agree that as long as a carbine is carried, a pistol with an effective range of from three to four hundred yards is unnecessary, and might, with advantage, be replaced by a lighter and handier weapon. When we consider the meager results which are attained after months of mounted target practice with the present pistol, its use seems hardly more reasonable than would that of a long-range rifle for sniper shooting.

The multi-ball cartridge was rejected by the Ordnance Department because its deadly effect was limited to seventy-five yards. Experience has abundantly shown that by no amount of practice, or instruction can the average mounted soldier be educated to make effective use of the pistol at distances beyond fifty yards, and for most men the firing at twenty-five yards and beyond is very random and uncertain in its character. It would, then, seem that the pistol should be made as effective as possible up to the limit of fifty yards, and that for firing at greater distances resort should be had to the carbine, which can be used on horseback with equal facility, and probably with increased accuracy. If the multi-ball idea can be so utilized as to give a considerable dispersion to the projectiles contained in the cartridge at ten yards and beyond, sufficient penetrative force being preserved to inflict deadly wounds at fifty yards, the result will be a far more effective weapon than the long range pistol now in use. Admitting that the pistol can be used as a charging weapon, it would hardly be claimed that the firing should begin before approaching within fifty yards of the opposing force, which is about the distance at which the actual charge should, in any case, be ordered. The increased effectiveness of such a weapon in the *mêlée*, or whenever used defensively, is apparent, and needs no argument. In the pursuit of fleeing cavalry the long range arm might have some advantage if it could be fired

with any degree of accuracy, but a pursuit continued after a distance of fifty yards has separated the hostile forces is of rare occurrence, and the carbine can always be used when necessary.

The pistol is a weapon which should under no circumstances be separated from the person of the trooper. It is essentially a defensive arm, and is frequently useful in an extremity, as when the wounded soldier, on the battle-field, is exposed to the attack of those merciless ghouls and robbers who sometimes infest armies to prey upon the unfortunate victims of battle. It must be carried on the waist-belt, which is a powerful reason for reducing its present excessive and burdensome weight. A holster should be provided, which, while protecting the barrel and breech mechanism, and holding the pistol securely, would leave the stock uncovered and ready to the hand. This could be effected by steel springs in combination with the leather, and no great amount of mechanical skill or ingenuity should be necessary for the production of such a holster.

The saber is far from being a perfect weapon, and yet no very radical change in its character appears possible. We often hear its sharpening advocated. It has even been suggested that it be issued from the arsenals in such condition that a sheet of paper lightly struck across its edge would be cut in two. This, with the addition of a wooden scabbard, it is claimed, would render it a much more effective weapon. Certainly such a weapon would be very dangerous to our own troopers, considering the moderate degree of skill in the saber exercise which they now possess. It would be folly to place such a saber in the hands of any but skilled swordsmen; and with the limitations which surround our troopers, we must be content with a moderate degree of proficiency in each of the manifold acquirements which go to make up their general efficiency.

The four or five thousand cavalry of our regular establishment would be a totally inadequate force to rely upon in the event of war. With a three years' enlistment (no reënlistment being permitted except in the case of non-commissioned officers and artificers), a reserve of instructed men could be formed, which, even if unorganized, would, doubtless, in the event of war, be found available for service, either in the ranks of the regular regiments or as volunteers. The present period of enlistment is, practically, for three years only, and those men who fail to attain the grade of non-commissioned officers during this period of service, are seldom fitted for the acquirement of much additional skill in the use of arms. Our object should then be to make the instruction of this three years' course as complete as possible, without giving especial importance to any one branch. The

fencing exercise of the new drill regulations is well calculated to awaken an interest in acquiring skill with the saber, and it may be supposed that many men will keep up their practice after leaving the service.

With the sabers as now issued an effective thrust is well nigh impossible; the ordinary clothing affording effectual protection against their blunted points. A cut, however, if delivered with vigor against the head, will have a stunning effect, be the blade ever so dull. This is opposed to the teaching of the drill book, but it is possible that the instructions therein contained, to prefer the thrust to the cut whenever practicable, contemplate a sharper saber than the one now in use. And there would seem to be no sufficient reason for not having the point and the first ten inches of the blade somewhat sharpened—not to the keenness of a razor, but to the degree which is consistent with the use of the steel scabbard. In some regiments, previous to and during the war, grind-stones were brought into requisition for this purpose; but as such grinding destroys the polish of the blade and induces rust, it is preferable that the sharpening should be done at the arsenal before polishing, and blades retained in the condition as issued.

A further improvement should be made in the saber by modifying the present clumsy shape of the gripe. The swell of the front part of the gripe, giving it an extreme thickness of about one and a half inches, interferes very seriously with the proper position of the hand when the thumb is extended along the back of the gripe, as it must be in all movements of the exercise except thrusts to the right and rear. This shape of the gripe renders it almost impossible for men whose hands are not above the average size to acquire any facility in the use of the saber; a fact which should become fully apparent if the fencing exercise prescribed by the new drill regulations receives serious attention.

The objections to the steel scabbard are that it is noisy, and that it would render it difficult to keep the blade sharp if issued in that condition. It, however, seems impossible at present to find a serviceable substitute for it. No non-metallic substance available possesses sufficient durability to stand the hard knocks to which a scabbard is subjected when the saber is attached to the saddle, as it must be when the trooper dismounts to fight, and as it should be at all times in order that he may have perfect freedom of action. The noise is reduced to a minimum when the saber is made fast to the saddle in a proper manner, and such sharpness as is essential or desirable is not affected by the use of the metal scabbard.

The stiff and clumsy strap now furnished as a saber knot, could be advantageously replaced by a light and flexible knot of braided leather. This necessary appendage would then, perhaps, not be so unpopular as it now appears to be.

The present modification of the "Stuart's saber attachment" appears to answer its purpose, though it is believed that a well made steel hook of the original pattern would be an improvement.

The woven cartridge belt is superior to any appliance heretofore furnished for carrying cartridges; nevertheless, it is not quite perfect, as the cartridges will sometimes stick fast in an exasperating manner. Should a magazine gun be furnished, it will probably be necessary to carry the cartridges in packets suitable for insertion into the magazine, which will render the cartridge belt in its present form obsolete, and involve the adoption of some more suitable device.

The sling-belt and swivel are simple and effective, but the swivel would be much improved by providing the short side with the corrugated thumb-piece devised by General KELTON.

The battered condition in which many carbine barrels are found at the end of every tour of field duty, through contact with the trooper's spurs and from other causes, is a sufficient argument for the provision of some sort of covering for the whole metallic portion of the arm. With a carbine of the present length of barrel the use of a closed boot of stiff leather is practicable, but any increase in the length of the boot would render it somewhat unwieldy and inconvenient. It is possible, however, that the new carbine may be provided throughout the length of its barrel with a protective jacket after the style of the present German rifle, which would, in a measure, obviate the necessity for a long boot.

Our present saddle is a modification of the one devised and recommended by GEORGE B. McCLELLAN upon his return from Europe in 1857 or 1858, where he had been sent, when a captain of cavalry, to observe and report upon the organization and equipment of the armies of the old world. The original McClellan horse equipment, which was first issued for trial about the year 1859, was, as I remember it, far superior to any which has since been furnished by the Ordnance Department. The bridle was combined with a head halter, the bit being detachable. The equipment throughout was of fair tanned leather, the saddle being covered with the same material, while the bit, the buckles and all ornaments were brass plated. The saddle pockets were of a capacity befitting the modest wants of a trooper, and, in this respect, were in striking contrast to the Saratoga trunk attachments of our present equipment. The McClellan equip-

ment had not been generally issued to the cavalry when the Nation was called to arms in 1861, and the exigencies of war calling for large numbers of saddles, in the interest of economy the ornamental part of the equipment was dispensed with. Ordinary black leather took the place of the stylish, fair-tanned, and the saddles were covered with raw-hide. The equipments of the war period were manufactured by contractors who enhanced their profits by inferior material and workmanship; but nevertheless, the so-called McClellan equipment stood well the test of war service, and was a vast improvement upon the old Grimsley which it displaced.

At the close of the war large numbers of these contract made equipments were left on hand, and several years elapsed before all the old stock was disposed of. Then the saddles were covered with black leather, brass was substituted for iron in the rings and buckles, the Shoemaker bit, with its polished steel, took the place of the homely and ponderous McClellan, and, in appearance at least, the equipment was much improved. Another change, however, which took place at this time has not been justified either in point of utility or appearance. The small saddle-pockets, which had answered perfectly all the requirements of war service, were exchanged for the huge saddle-bags, patterned after those of the western traveller, which pound the flanks of our horses whenever a faster gait than a walk is taken. The old Grimsley equipment had some very serious faults, but it had the virtue of permitting the pack to be fixed fast to the saddle, instead of having the various articles hung on in front and rear, and left to flap and dangle against the horse's sides, according to our present style.

Major DWYER gives the rule for seats as follows: "The saddle in the center of the horse's back; the girths, stirrups and rider in the center of the saddle;" and it will be difficult for any one who has read with care the first and second chapters of his work on "Seats and Saddles" to doubt that this rule is founded on perfectly correct principles. This style of seat has always been that of our western range-riders, and cavalry officers have more than once sought to adopt it.

Captain HALL tells us (in the *JOURNAL* for July, 1888) that "the correct position of the saddle is obtained by cinching it very tightly so that the cincha shall be midway between the elbow and stifle joint, when the horse is standing square with his legs under him;" he further adds that "it is of great importance that the cincha be very tight, in order to reduce as much as possible the slipping of the saddle upon the back." Captain HALL says that he has saddled his

horses exclusively in this way for twelve years, and found "not a single objection." It has, however, been my experience that tight cinching invariably produces saddle boils and sore backs, and my efforts to keep the saddle in its proper place have generally ended in failure from this cause. In the First Cavalry, and possibly in other regiments, this result has been sought by an arrangement of the front and rear girth-straps, which admits of a reciprocal shortening and lengthening, thus changing the bearing point of the cincha. By this method, however, the saddle is given an unequal bearing, which must tend to the production of sore backs. The frontiersmen have solved the difficulty by using two cinchas, the second one well back. This method would be objectionable in the cavalry from the increase in the weight of the equipment and the additional time which would be required in saddling.

Now is it not worth while to enquire if the desired result may not be attained by a change in the shape of the bearing surface of the saddle? Major DWYER says: "To begin with, the under surface of the saddle—the portion coming in contact with the horse's back—we find two principal points for consideration: Its shape or form, and its size or extent. One general mechanical principle applies to both, namely, that the larger the surface over which a given amount of pressure is equably spread or divided, the less will be the action on any given point of the other surface in contact; and this translated into plain English means, as regards shape, that the under surface of the saddle should bear as nearly as possible the same relation to that part of the horse's back it is intended to occupy as a mould does to the cast that is taken from it, always saving and excepting that strip lying over the horse's backbone, which must remain altogether out of contact." We have been instructed for years to place the saddle "well forward on the withers," and an examination of the saddle will show that it is designed to fit that portion of the horse's back, and that it does not and cannot be made to fit the portion lying above the fourteenth vertebra. Consequently it cannot be retained in that position except by undue and injuriously tight cinching or some other objectionable device; and when so retained, its under surface will not be in equal contact with that portion of the horse's back which it covers. The author of "Seats and Saddles" further tell us that "the grand rule is to arrange the saddle itself and the stirrups so that the rider can sit only in the proper position, that he falls naturally into it, and that it requires no muscular effort to maintain it." He also shows how this result can be assured when the "Hungarian" saddle is used, by lacing the bearing or seat strap

according to the conformation of the rider. With our saddles no change in the shape of the seat is possible, and the necessity of giving the horse's back the first consideration usually results in the saddles being fitted to the horses rather than to the riders; thus it is not uncommon to see a number four man in a number one saddle, and vice versa, so that we have seats in a great variety of styles. I am inclined to the opinion that in the regulation saddle the curve of the cantle, with reference to the place of the stirrups, is too abrupt to admit of a secure, natural and comfortable seat. Certain it is that when the saddle is too small for the rider his body is pitched forward out of equilibrium, causing an undue strain upon the muscles of the inner thigh, and rendering the seat insecure. This style of seat not only gives the trooper much discomfort, but on long marches causes a great deal of positive suffering, with consequent detriment to his efficiency. Soldiers seldom or never find fault with their saddles. Pride, ordinarily, prevents them from acknowledging any excessive degree of fatigue, and they accept the discomforts of a forced and rapid march as necessary and unavoidable, without thought or inquiry. Old soldiers, however, taught by experience, will usually seek a large saddle for comfort, using an extra blanket under it, if necessary, to make it fit the horse. The truth of the observation in Major HENRY's letter, published in the March number of the JOURNAL, that the power and endurance of the horse, "when properly trained, are limited only by that of his rider," will hardly be disputed. Putting aside then all humane considerations, is not this subject worthy of attention on grounds of professional expediency? The clumsy and unattractive appearance of the "Hungarian" saddle does not recommend it to cavalrymen accustomed to the neat and shapely "McClellan;" but it would seem that the inventive genius of the American people should be equal to the production of a saddle combining its features of adaptability to the varying shapes of the horse's backs and the seats of the riders, with simplicity of construction and grace of outline.

The saddle-blanket has advantages not possessed by any form of pad, and should be retained.

The importance of proper biting, and the defects of the present regulation bit, were fully and forcibly set forth in the JOURNAL for July, 1888, by its present editor. In that article it was conclusively shown that the Shoemaker bit is constructed on utterly wrong principles, that its use is attended with a large amount of unnecessary pain and discomfort to our unfortunate horses, with the result that large numbers of them are rendered restive and unmanageable, thus

presenting a serious obstacle to the improvement and efficiency of the cavalry arm. My own experience has been very similar to that of Major CARR's, and I am certain that I have seen many good horses rendered useless for cavalry service through the impossibility of fitting them with proper bits from those supplied by the Ordnance Department. I am confident that other officers will testify to the same effect, and that a majority of cavalry officers will condemn the Shoemaker bit. As nearly three years have elapsed since the article referred to was published, while no steps have been taken to correct the evil, it is evident that no change can be hoped for until some more effective method can be found for calling attention to the subject. In this matter of bits and biting there is not much room for personal opinion. The principles which govern are susceptible of accurate demonstration, and by their application it can be readily determined whether or not our present bit is properly constructed. The military system which affords no method by which a matter of such importance can receive attention and investigation is indeed wonderful.

In considering the remaining articles of the equipment it should be remembered that in these days of smokeless powder and constant improvement in the deadly effect of fire weapons, the efficiency of cavalry is more than ever dependent upon its celerity of movement; and if we are not prepared to agree with the British officer, who in his letter to the *London Times*, (as published in the *JOURNAL* for March), proposes to strip the horses of all dead weight except a twelve pound saddle, resorting for this purpose to pack animals which are to follow the squadron, carrying everything which the troopers may require, we may yet concede the necessity of reducing the weight of the saddle-pack as far as may be possible by rigorously discarding every article, both of equipment and the soldier's personal belongings, which can possibly be dispensed with.

Our present saddle-bags were adopted upon the recommendation of cavalry officers, who, because they had at times found the similar large traveling-bags of the western frontiersman useful for scouting work under certain conditions, were misled into the opinion that the cavalry equipment would be improved by adding to it an appendage apparently so useful and practical. Absorbed in the work of the frontier, which consisted for the most part of toilsome marches over rough and broken country, where a faster gait than the walk was seldom practicable, they forgot for the moment that such use of cavalry was exceptional and temporary in its character, and that its true efficiency must be tested under the widely different conditions of war

and battle. We have now carried these bags, in their present form, some twelve years. Their weight when empty is about equal to that of the packed valise of the Grimsley equipment, while packed to their full capacity they would almost suffice for the burden of a pack-mule. They are, however, carried as seldom as possible, and I have never yet seen their capacity fully tested. Attached to the rear end of the saddle and hanging down over the flanks of the horse, their pounding motion when the trot or gallop is taken cannot be otherwise than distressing to the animal, and must tend to impair his powers of endurance.

I would replace them by two pockets, eight or ten inches long and five or six wide, fitting closely to the saddle, the lower portion of each being attached to, or forming a part of, the rear girth-strap. These pockets would have sufficient capacity for a change of underclothing and all other essential articles for the soldier's use. Similar pockets might be attached to the pommel of the saddle on either side as receptacles for the rations, to take the place of the haversack. All these pockets should be made a part of the saddle, not to be detached from it.

The lariat and the picket-pin are a survival from the days when the cavalry had the boundless West for its scouting ground. Before the advent of the squatter and the cattle herds of the ranchman the luxuriant grasses of the river bottoms afforded abundant subsistence for the horses, even within the grazing limits of a lariat; and the impossibility of transporting forage on long expeditions, or of procuring it by purchase in the unsettled regions where operations were conducted, together with the risk attending attempts at herding in a region which was the home of the Indian and the buffalo, rendered the lariat and the picket-pin necessary articles of equipment. The conditions have changed. All the ground suitable for agriculture, and much fit only for grazing has been enclosed; while countless herds of hungry cattle strive together, winter and summer, for the scanty herbage of the open ranges. Cavalry horses must either take their chances running loose with the cattle, or the privilege of grazing within the enclosures must be paid for.

When it began to be apparent that the lariat could no longer be depended upon for grazing purposes, the side-line hobble was introduced. The usefulness of this article has, however, been affected by the same causes which have rendered the lariat and the picket-pin superfluous. It is a hollow mockery to turn cavalry horses out with hobbles to compete with cattle for the grass of the free ranges. When enclosed fields are used of course hobbles are needless. Certainly opportunities may occasionally be presented for the use of these arti-

cles; but all horses can be accustomed to herding, and it has been my experience that when it is unsafe to herd it is also unsafe to trust to either the picket-pin or the hobble. Forage can often be procured by purchase within a few miles of camp, and it is seldom necessary to transport it for very long distances. Horses are usually herded during the hours of daylight, and tied to a picket line and fed hay at night. When hay is wanting, early and late grazing is resorted to to make good the deficiency. Certain it is, that only in the exceptional conditions which surround the service of our cavalry on the western frontier, can grazing to any extent be depended upon; and, notwithstanding the Pine Ridge campaign, it may be asserted that the time has come when the equipment as well as the training of the cavalry should no longer be based upon these exceptional frontier conditions, but upon the requirements of ordinary warfare. Without being considered a part of the equipment, lariats, picket-pins and side-lines might be kept at posts and supplied wherever and whenever the conditions of service are such as to admit of their effective use. Doubtless there is a sufficient number of these articles now on hand to supply all future demands for them. Will it not be the part of wisdom then to relieve the horses of the weight of these useless burdens, and the troopers from the labor and responsibility which their care requires?

If a lariat is sometimes useful to the trooper on picket duty, or on the skirmish line, by permitting him to leave his horse under cover while he creeps forward to a suitable position for observation or for firing, the present heavy and clumsy rope is not well adapted to the purpose. A thick cord, however, half the size and weight of the lariat now furnished would, for the purpose indicated, be a useful addition to the equipment.

The nose-bag is indispensable, and a sack for carrying grain, having a capacity of not to exceed fifteen pounds, and constructed so as to admit of being strapped to the cantle or pommel of the saddle, should be furnished.

The most important part of the trooper's equipment remains to be mentioned. The cavalry horse as specified by the regulations, is all that can be desired. If only it were possible to procure such horses! As the years go by the hope that private breeders may be induced to give attention to the wants of the cavalry service grows fainter. Inspectors, apparently, find it useless to seek for qualifications beyond those relating to age, height and soundness, together with such a degree of docility as will permit the horses to be handled and ridden without serious danger. When these horses have been

raised on western ranches, months of patient and thankless labor must be expended in efforts to subdue, even partially, the wildness acquired in the free life of the range. The labor is thankless because these ill-bred animals are not, for cavalry purposes, worth the labor which must be expended upon them. A good horse attaches the trooper to the service by a powerful bond, while the discouraging effect of daily and hourly contact with a vicious and ugly brute has driven many a good soldier to desertion—even though this fact does not always appear in the Boards' of Survey proceedings. I am prepared to believe that the only effective remedy lies in the establishment of government breeding farms. There the type of the cavalry horse could be formed and perpetuated. There the systems of RAREY and GRACE and other horse-breakers would have no place. The gentling and educating process would begin with the first year of the animal's existence, and he would be insensibly formed, as his growth continued, into a perfect realization of the cavalryman's ideal—a constant joy and delight to his rider.

Let us then cherish the hope that amid all the reformatory projects which disturb the peaceful current of the service routine, this dream of the cavalryman may find its place; and that the future cavalry horse of America may be produced with national characteristics no less remarkable than those which distinguish his rider. When we shall have secured this ideal charger, let us not weight his feet with a heavier burden than six ounce steel shoes. Then, mounted and equipped as no other cavalry in the world, we may worthily aspire to lead in all which pertains to true cavalry efficiency.

MILWAUKEE, WIS., May 19, 1891.

MOSES HARRIS,
Captain, First Cavalry.

LETTERS ON CAVALRY, BY PRINCE KRAFT ZU HOHEN- LOHE-INGELFINGEN.

TRANSLATED BY COLONEL R. P. HUGHES,
INSPECTOR GENERAL, U. S. ARMY.

SEVENTEENTH LETTER.—THE CAVALRY DIVISIONS IN PEACE.

IF you draw the conclusion from my last letter that opportunity must be given the commanders of lines to lead their lines in division combinations as often as possible, you are quite right.

You will find the proof that I fully agree with you in the wish that I gave expression to in a previous letter, to-wit: That the men of the cavalry might serve until the 1st of November, in order that time could be found during the month of October for maneuvering the cavalry in division organizations after the great autumnal maneuvers.

If you have drawn a still further conclusion, and are of the opinion that it is necessary to have the cavalry divisions organized in time of peace exactly as they are to be organized in operating against an enemy in case of war, then various objections become apparent, and although much can be said in favor of such a course, still, there are equally strong reasons against such an arrangement.

Each infantry division still requires a certain amount of cavalry to be attached to it, and after detaching one regiment of cavalry to each infantry division, if the cavalry is to be organized in peace as it is to operate in war, then all the remaining cavalry would have to be formed into divisions of six regiments each. This would result sooner or later in creating two kinds of cavalry—that of the cavalry divisions and the divisional cavalry. The first, consisting of a large combination of similar elements, would, in course of time, look down with patronizing superiority upon the isolated cavalry regiments attached to infantry divisions, and finally the idea would be created in the army that there were two grades of cavalry; a difference which would not be advantageous in any way to that arm of the service as

a whole. Only an emulative comradeship of the entire army can secure the general development of it.

Besides, such a marked difference between cavalry divisions and divisional cavalry does not exist in war. The regiments are frequently exchanged and relieve one another. This would be simply impossible if the cavalry were originally separated in peace and were given different instruction.

I hold it to be of the greatest importance that all the cavalry should be exercised in division maneuvers every year, and it should receive practical instruction each year in the duties of divisional cavalry. If, however, permanent cavalry divisions existed in time of peace, and were separated from the divisional cavalry, this double instruction could not be accomplished; the regiments of divisional cavalry would never take part in the exercises of great cavalry organizations, and on the other hand, the regiments of the cavalry divisions would never participate in the exercises of mixed commands. In order to form the cavalry into divisions they could bring together all the cavalry of each army corps as is now done in the Guard and Twelfth and Fifteenth Corps. But in the other army corps this course would interfere with the main object had in view in the forming of the cavalry divisions, viz: In bringing the peace formation into harmony with the war formation and in facilitating and hastening the transformation from one condition to the other. We cannot form as many divisions of cavalry in time of war as we have army corps unless we form some of them of but three or four regiments; for most of the army corps have five or, at the highest, six regiments of cavalry each, and of these one must be attached to each infantry division.

This would not do. What is the reason that only two divisions of cavalry exist in the Prussian army in time of peace? Because we have but two army corps having eight cavalry regiments in their normal organization. These corps give one regiment of cavalry to each division of infantry, and then take the field with the other six regiments of cavalry united in one division, which is their normal formation for both peace and war.

An enthusiastic cavalryman will, perhaps, desire that more cavalry be formed, i. e., eight regiments per army corps. But they will not increase the cavalry in order to realize the pet idea of having the cavalry organized into divisions in time of peace. The numerical proportion of the cavalry to the infantry depends on other and more pressing conditions than the formation of independent cavalry divisions.

In the demands for the formation of cavalry divisions in time of

peace, we hear, in cavalry circles, of an organic separation of the cavalry divisions from the organized army corps, and of uniting them for inspections, which could be under the guidance of a general inspector of the cavalry. It is a remarkable coincidence that the demands for a separation of this kind should be heard from the cavalry just at this time when the artillery expresses a general desire to enter into closer relations with the army corps. This appearance alone gives good cause for doubting the propriety of such a radical change, and the desire of the artillery for an intimate organic union with the other arms, in time of peace, establishes the fact that separation has its disadvantages. It must be taken into consideration further, that we have historical examples of such an organization. After the peace of Hubertsburg, **FREDERICK THE GREAT** created such cavalry inspections. He was himself the Inspector General of the cavalry. This organization sustained itself as long as men like **SEYDLITZ** were at hand to infuse nerve and life into it. But later, the cavalry gained nothing by it, as is proved by the figure they cut in the war of 1806. Although the latest historical investigations have indicated that the cavalry of 1806 did not fully deserve the severe reproaches hitherto heaped upon it, yet the conviction cannot be avoided that it did not feel itself in sufficient harmony with the other arms to stand always ready to give prompt assistance, and that the long isolation of the cavalry had greatly assisted in bringing about this condition of things.

How may this happen? In my last letter I have set forth how many characteristics must be united in a man to make up a capable leader of a cavalry brigade or division—strength, youth, fine equitation, endurance, sharpness of eye and theoretical education, (characteristics that often antagonize one another) and, although we may very rarely see all these requirements united in one cavalry leader, yet, they are even more necessary for a competent cavalry inspector.

Under an inspector who has been selected simply because he was a good officer in the routine duties of his arm, the cavalry will certainly receive an incompetent and sluggish direction, and in case of a long peace will finally let side affairs become the chief objects. Trifling objects, such as fat horses, fine performances in the riding hall, would become of chief importance and would have a very detrimental effect upon the war requirements of the cavalry. With **WRANGEL** such pedantry was swept away as by a strong, fresh wind. We have had experience in the past with old cavalry officers of high rank and glorious records, who, in their efforts to secure uniformity in the regiments confided to them, allowed their attention to be occupied by

unimportant things to the injury of the whole. An instructor in the riding hall would be reported as quite incompetent if, at the conclusion of the drill, he permitted the detachment to come into line on a different side, and with a different front from that with which it began, or if he varied from the exact routine of the prescribed drill or changed a command. To one of these gentlemen it seemed quite impossible that one of the regiments of his command should have straw for bedding and another not, and, in spite of the representations made to him that the stables of the one stood on dry, sandy soil, and that the others were located near the river, on wet ground, where the dampness affected the bedding and made it unhealthy, which did not take place at the former, still he ordered "uniformity." Everything was neglected that could not be brought into a general system of uniformity—field service, education in the terrain, coöperation in attacks with other arms. It will not be denied that this must be the foolishness of an idiot. I must repeat that these men had glorious records of past services. I am convinced that this deteriorating and stifling process would gradually, but greatly, increase during a prolonged period of peace if the arm be not so organized as to compel familiarity with its many and various duties by means of constant practice. That can occur only by keeping the cavalry combined with the other arms, and subject to the control of the corps commanders during times of peace.

But one can be done and the other not abandoned, and if the cavalry cannot and will not be increased, unite the cavalry of each two army corps in time of peace into a cavalry division and put it under the command of one of the corps commanders. Then a division of cavalry formed from two army corps must consist of at least ten regiments in time of peace, formed in three brigades; and on mobilization, one regiment must be detached to each of the four infantry divisions, as divisional cavalry, and thus go into war with a strength of three brigades of two regiments each. This would not result in any great alteration; but let us examine this plan in a concrete manner. The cavalry of the First and Second Army Corps forming a division of ten regiments in the First Corps; that of the Fifth and Sixth Corps of the same strength to the Fifth or Sixth Corps; that of the Third and Fourth Corps in a division, of eleven regiments, to the Third Corps; that of the Ninth and Tenth Corps in a division, of ten regiments, to the Tenth Corps; that of the Eleventh and Fourteenth Corps, of the same strength, to the Fourteenth Corps; while the division of the Guard, Twelfth and Fifteenth Corps remain in their hitherto peace formation. Now the division to be formed of

the Seventh and Eighth Corps and probably attached to the Eighth, would be too weak (eight regiments,) and after detaching the divisional cavalry would have only four regiments with which to take the field: equal to that of the Twelfth Corps. Even the cost of such a change in organization would not be important; it would reduce one brigade staff for each of the newly created division staffs.

But let us represent to ourselves the result of such a division of command; the principle of territorial boundaries for our army corps districts would be disturbed everywhere; constant annoyances and conflicts of authority would be unavoidable; the regulating of the recruiting and the completing of the mobilization would be very much complicated and delayed, and the existing principle of simplicity, in this work, would be greatly injured.

If cavalry ceased to be a part of the army corps in whose district it was garrisoned and consequently more isolated from the other arms, operations between the troops of different army corps—in order to secure a wider and more general instruction, either of a theoretical or practical nature—field maneuvers of entire garrisons of great cities would constantly become of more rare occurrence, the estrangement between the troops of the different arms of service would become greater and greater, and the instruction of each branch would gradually become more and more one-sided. I can recall having seen an infantry regiment, when I first entered the service, whose officers had never seen a cuirassier regiment. That should have excused their want of dexterity in operating with other arms. Something similar would occur again.

Now we come to a point of a more tender and delicate nature. Have we in peace, for independent cavalry divisions a sufficient number of commanders who possess the necessary experience and knowledge of the service for such a post, and the necessary characteristics, viz: eye, youth, endurance in riding, etc.

What would be the results of introducing independent cavalry divisions throughout the whole army? The army divisions would be infantry divisions and commanded by infantrymen only; the cavalry divisions by cavalrymen. A cavalry general who no longer possessed the requisite youth, endurance, and quickness of decision for a cavalry division must quit the service, and many a deserving, capable man would thus be thrown out of the army, who in knowledge of his profession and experience in command, was eminently fitted to render important services to the state at the head of an infantry division or even an army corps.

In comparison, the present condition seems much preferable. We

have on exceptional occasions formed a few cavalry divisions when necessary and obtainable. The cavalry is united periodically for the purpose of maneuvering in divisions under the brigade commanders, and from those who show themselves to be the most dexterous are selected the commanders for the mobilization of the next year. The instant war is declared, all regard for seniority is silenced; then we see a general of cavalry and a prince of the kingdom command a division, and the commanders for the cavalry division are chosen from the ablest army division commanders and from the youngest brigade commanders. And should we give up this extremely practical condition in order to create an organization which has been tried and failed?

Is the formation of cavalry divisions during peace really a pressing necessity?

There are two main considerations which make this need appreciable.

The first is the necessity to have the cavalry regiments exercised in division organizations, and the second is harmonizing the peace organization with the war organization, in order to dissipate as much as possible any difficulties that may appear, at the critical moment, in mobilization. That the exercising of the cavalry in division organizations is urgently needed, that it is very desirable, that every regiment should take part in such exercises every year, I have previously stated in detail; likewise how it seemed to me this might be accomplished. But that cavalry divisions must be organized during peace, I cannot grant. On the contrary, by pursuing the course we have followed heretofore of assigning brigade commanders, in turn, to the duty of conducting such exercises, and especially if such exercises take place in each army corps after the maneuvers with mixed arms, we can have many more cavalry commanders exercised in leading such mounted masses, and can recognize who among them should be chosen in case of war breaking out.

In the transformation from a state of peace to a war footing in our last great mobilization the commanders of cavalry divisions found much trouble, and much discomfort and fatigue was caused, in these newly organized commands by the strangeness of the personnel and because the newly created generals were not familiar with their regiments and scarcely knew where to find them. I can well imagine the discouragement of a division commander when, arriving with his staff at the destination indicated in the railroad transport, he finds no command and has no idea as to the whereabouts of his regiments. But he searches for them and finds them. The direction of the rail-

road transportation could not be turned over to him, but must be conducted by the Railway Commission of the great General Staff; it could not be communicated to him beforehand, for alterations may be made according to the changes in conditions, but the regiments were correctly scheduled and soon assembled. Such things could not fail to happen to many of our commanders in changing from a peace footing to a war footing in our last war. For example, the commander of the Guards Corps was billed from Berlin to Homburg in the Palatinate. During the two days' railway journey we found ourselves suddenly passing stations that did not appear upon our railway card. At one of the resting stations one of the train conductors informed us that our destination had been changed by telegraph. The change in the meal times soon excited astonishment and laughter; as for example, 8 o'clock in the morning, supper; 9 o'clock in the evening breakfast was served and the necessary halt was made. We finally arrived. But where? Upon inquiry we found that we were in Mannheim. Where the troops of the corps were no one knew. They were hunted up by telegraph. After a day's rest marching orders came, and we arrived in Kaiserslautern at the end of the second day. We found the Guard Cavalry Division already there before us, although it had quitted Berlin after we did; yes, we even saw that they were unloading our ammunition trains at the depot. Such things will, and must happen when the measures of the enemy make changes in dispositions necessary. That did not rest upon the non-existence of cavalry divisions during peace.

Besides, many of the higher commanders are changed at the moment of mobilization and are strangers to their new commands. I remember well that at the mobilization of the Guard Corps in 1870, both infantry divisions were given new commanders and most of the army corps also. In the higher commands it is not so important that they remain in the same position in mobilization. The main thing is, that complete regiments should be easily and quickly transferred from a state of peace to a state of war. United, well instructed regiments can easily be introduced into other brigade and division organizations. That often happens in all arms, and has never led to insurmountable difficulties.

It is necessary only that these regiments should be carefully and thoroughly instructed in tactical combinations that may be applied in war by these larger commands.

If, therefore, all cavalry regiments should participate annually in maneuvers of cavalry divisions; if they are exercised, not only in the established forms of the regulations and rules of tactics relative

to conduct in great tactical units, but in marching and in the system of command in division combinations, then it will be much less difficult to unite them quickly in brigades and divisions at the outbreak of a war. The complaint about the little cohesion in cavalry divisions at the beginning of our last war must be answered by saying, that until that time a very small fraction of our regiments had ever been through any evolutions in a division organization.

All discussions that I have had upon this subject with the advocates of the formation of cavalry divisions during peace have only strengthened me in my views, and I fear the introduction of such a change in our organization must, when extended throughout the whole army, result in more mischief and disadvantage, than advantage.

In this letter I have often touched upon the question of an increase in our cavalry, and have intimated that the number of cavalry that we keep up depends upon other conditions than the peace organization of that arm. Permit me to say a few words more concerning its numerical condition. There are various rules given in the numerous text books. It is said that as many squadrons are needed as there are battalions, or that the cavalry must be such a per centum of the army. These are demands which are based simply upon empiricism, as has been announced at various times heretofore, or upon an old foundationless theory. I have pointed this out in my first letter.

Since general military service has become a reality, we can call up at the outbreak of the war every serviceable horse as well as every serviceable man for the defense of the Fatherland. In the great importance which a cavalry mass has, in the incalculable advantage that a superiority in cavalry would give us over our enemy from the very opening of hostilities, since it blindfolds him, but extends our sight, since it confines him and secures us freedom of action; binds his hands while we strike him heavy blows, we cannot have too much cavalry, and the answer, therefore, is very simple, viz: We must maintain as many regiments of cavalry as possible. If we were to make inquiry of the Remount Commission of the War Department we would certainly receive the reply, that the horse-breeding industry of our country would not admit of our getting the necessary annual remounts for more cavalry. I am fully convinced, if this answer were otherwise, that our government long since, either after our last war or upon the occasion of the last increase in the number of our infantry regiments, would have obtained the necessary means for the formation of more cavalry regiments.

The theoretical question of heavy and light cavalry is also quite

interesting. In my youth I was taught that it was necessary to have one-quarter heavy, one-half light and one-quarter medium cavalry. I must now laugh at all this. Heavy men must not be mounted on light horses. Heavy men on heavy horses make heavy cavalry; light men on light horses make light cavalry. With the Huns there was no heavy cavalry, and Germany had no light cavalry at the date of the cavaliers of the Middle Ages. Since Arabian blood has been introduced into our horse-breeding we have light cavalry, a good deal of light cavalry. Thus the condition of light and heavy cavalry exists of itself and forces itself upon the government as a stern necessity, but is not subject to its will.

THE STONEMAN RAID OF 1865.

I THINK I shall be quite within bounds in saying that no enterprise of equal importance during the late Civil War attracted so little attention as the "Stoneman Raid of 1865." Whether considered with reference to the actual physical results accomplished, or as a part of that comprehensive plan of operations, designed, not for the capture of Richmond merely, but for the overthrow of the Army of Northern Virginia, it was a very important expedition, and deserves special mention in history; and yet I presume the average American citizen is about as ignorant of it as of things that have never happened. This is not so strange when we consider the surrounding circumstances. So many other operations of greater importance were going on, that all eyes were directed elsewhere. WILSON, with his magnificent army of cavalry, was swooping down through Alabama, accomplishing what seemed to be miracles of valor, carrying by storm fortified positions of great strength, heavily armed and strongly manned. His thin lines of dismounted cavalry charging through abatis, over entrenchments and heavy parapets, driving before them the veteran infantry of the Confederacy, capturing prisoners and artillery in immense numbers, produced so great an effect that the true story of his wonderful march reads more like romantic fiction than the sober realities of actual war.

CANBY and FARRAGUT were knocking at the gates of Mobile. SHERMAN, with his great army fresh from its triumphal march to the sea, was stalking with the stride of a giant through the Carolinas; while GRANT, with tireless and never ceasing vigilance, was tightening his hold upon Richmond, and preparing for those final blows which were to shiver the Confederacy in pieces. What wonder that the eyes of all people were directed to these great operations, and that few thought of the movement of a small division of cavalry starting from East Tennessee and destined to accomplish a service, which in certain contingencies would have been of the greatest moment in the great tragedy of war then drawing to a close.

In the spring of 1865, General GRANT anticipated that if LEE should be forced out of Richmond he might undertake to move through southwestern Virginia, and, driving our forces out of East Tennessee, strive to establish himself in some of the many strong positions which that mountainous country afforded. He would thus be enabled to greatly protract the struggle, though he might be hopeless of securing the independence of the Confederacy.

To prevent such a possibility, as well as to cut off General LEE's army from the rich supply fields of southwestern Virginia, General THOMAS was directed to send a force to destroy the railroads as far as possible towards Lynchburg, thus putting a great obstacle in the way of the movement supposed to be possibly contemplated by General LEE.

The expedition, consisting of three brigades of cavalry under the command of General STONEMAN, was concentrated at Mossy Creek, Tennessee, March 22, 1865. It moved toward the Virginia line, and on the 25th of March, ten miles west of Jonesboro, everything that could retard a rapid march was left behind; one ambulance, one wagon and four guns with their caissons being the only vehicles accompanying the expedition. There was at that time a considerable force of Confederate cavalry operating in southwestern Virginia, a fact which should be borne in mind to understand and appreciate the strategy of this movement. The object of the expedition was kept a profound secret. If any one but General STONEMAN knew it, the knowledge was not allowed to get to many of the subordinate officers. By the movement of one brigade to Carter's Station, the idea was conveyed to the enemy that we were going directly into Virginia. But by a rapid movement the command crossed the Wau-
tauga river higher up and struck directly across the mountains towards North Carolina. On the 27th of March we reached Boone, a little town far up in the mountains. At this place, Major KEOGH, of General STONEMAN's staff, a very gallant officer, afterwards slain by the Indians in the CUSTER massacre, with a detachment of the Twelfth Kentucky Cavalry, charged and routed a company of Home Guards, capturing sixty. At this point the brigades separated; General STONEMAN with PALMER's brigade, moving on to Wilkesboro by Deep Gap, while the other two brigades with the artillery moved to the same point by the Flat Gap road.

An incident occurred here, which, while of no special importance, may be of interest, as showing the embarrassment which sometimes came to an officer through the failure of a superior to give the necessary orders. I was sent with my regiment a distance of a mile or

more on a side road, to a place where I would find forage for my horses, with orders to be ready to move at 5 o'clock in the morning. I asked the orderly who brought the order, whether he had instructions for me as to the order of march in the morning; "No," he said, "you will receive the order in the morning."

We turned out early, got our breakfast, and at 5 o'clock stood with our horses saddled, ready to mount; but no order came. We waited an hour, and, receiving no word, I sent an orderly to see whether the other regiments were moving. He soon returned and reported all quiet in the other camps, with no signs of movement. We waited and waited. Seven o'clock, 8 o'clock, 9 o'clock came, but no orders. I then sent an officer to headquarters, to ascertain whether there were any orders for us. He soon came back and reported that everybody had gone. Not a soldier was to be seen anywhere. Where they had gone, which road our brigade had taken, was not known, and there was no way of finding out.

I could not think it was intended that we were to be left there, and so we moved out. Finding a road running to the east, along which a body of troops had passed, we took it, not knowing whether it was the road followed by our brigade or not. We marched all day without coming up with our troops, and without means of obtaining information. I do not remember that we saw, during the whole day, a single person of whom we could make a guide or from whom we could gain any information as to the country. Night came on, and it was so dark we could scarcely see our horses' heads. About 10 o'clock we came upon a broad stream. We did not know whether it was fordable, or where the ford lay if there was one. On the opposite side, lights could be seen moving back and forth, and the voices of men could be heard; but whose they were, was not known.

Supposing there must be a ford there, we resolved to try it. Having a large, strong horse, I started in first, and, although the river was deep and the current swift, we found a respectable ford. Just then came on a violent storm. When we reached the opposite bank, we found the battery belonging to the division, which had taken another road, stalled in a deep, narrow cut in the road, and it was with great difficulty that we could get past it. The banks on the side of the road were very steep, and, of course, very slippery with the rain. The rear battalion, not understanding the cause of the delay, turned back and went into camp on the other side of the river. Slipping and floundering along, many horses falling, we finally succeeded in getting past the battery, when an orderly found me, and brought the pleasing intelligence that we were to move nine miles down the river,

again cross the stream, which was rising rapidly with the violent rain, and go into camp. Weary, wet and hungry, this was not the most agreeable news, but like good soldiers we moved on, and at 2 o'clock in the morning we again forded the river, were conducted to a piece of woods, and told that we could make ourselves comfortable for the remainder of the night, and that under the circumstances, we need not put out pickets, as that duty had been attended to by our comrades who had gone before.

After disposing of the men as best I could, I sat down on the root of a large tree, leaned my head against the tree, and in less than two minutes by the watch was fast asleep. The rain continued all night, and in the morning I was awakened by the water trickling down my neck inside my rubber cloth coat. If you would have a picture of some of the minor discomforts of a cavalry raid, imagine the writer sitting on a log in the woods, near a sputtering fire, with a tin plate on his knees, a tin cup with coffee in it on a stump near by, making a breakfast of fried bacon and corn pone, while the breakfast was fast being cooled and the coffee rapidly diluted by the incessant rain. Up rides an officer, who exclaims: "Why, Colonel, what are you doing here? They have a good warm breakfast for you down at that farm house. There are about thirty of the fellows there, and they are keeping a place for you." It only needed some appearance of wings to make me quite sure that that man was an angel.

At this point the command halted for a day, partly for rest, and partly because a sudden rise in the Yadkin River had made fording difficult and dangerous; but more, I fancy, to give full effect to the sudden appearance of so large a body of cavalry in that portion of North Carolina, threatening both Greensboro and Salisbury. The strategy was well planned and effective. Had we moved directly into southwestern Virginia, the forces there could have so hindered and delayed our movements as to seriously imperil the great object in view. By this movement across the mountains, those forces had been avoided, and were so far away as to offer no serious obstacle to the accomplishment of our mission. What that mission was, was still a profound mystery to all not in the secret confidence of the Commanding General. The enemy was entirely deceived as to our point of attack. By a rapid movement to the north, General STONEMAN found the railway running from Lynchburg to East Tennessee, entirely at his mercy. At Hillsville, Colonel MILLER, with five hundred picked men, was sent to Wytheville—where he had a sharp engagement with the enemy, but succeeded in destroying a depot of supplies, and, on his march, two important railway bridges. At

Jacksonville, Major WAGNER, of the Fifteenth Pennsylvania Cavalry, with a small force, was dispatched to Salem, where he began the work of destruction, and carried it to within a few miles of Lynchburg. The remainder of the command moved on to Christiansburg, where it arrived about midnight, April 4th.

The Tenth Michigan was at once sent to the east to destroy the bridges over the Roanoke River, and the Eleventh Michigan to the west to destroy the great bridge over the river New. The next morning these bridges were effectually destroyed. About twenty miles east of Christiansburg the railroad crosses the Roanoke River six times in as many miles, and the Tenth Michigan destroyed six large beautiful bridges, five of them covered, a destruction which would have been avoided could the events of the next ten days have been foreseen. It was while engaged in the demolition of these bridges that I obtained a Lynchburg paper of the day before, giving an account of the fall of Richmond. News of our approach having preceded us, the train which brought the paper had gone no farther than the station where we were at work. I at once sent the paper by the fleetest horse to be found in the regiment to General STONEMAN at Christiansburg, and was thus fortunate in giving him the first information that he had of the fall of Richmond.

The main object of the expedition was accomplished. For a distance of one hundred and twenty-five miles, that railroad, so important to General LEE in case of his escape from GRANT, was in ruins. Nearly every bridge and trestle of any importance, for that distance, had been totally destroyed or entirely disabled. Well might General THOMAS say, in his official report, "A railroad was never more thoroughly dismantled than was the East Tennessee and Virginia from Wytheville to near Lynchburg."

The main object of the expedition had been accomplished. The railroad was in ruins, and Richmond had been evacuated. What would be General LEE's next effort? Would he undertake to make his way through southwestern Virginia into East Tennessee, as had been conjectured; or would he strive to unite his army with that of General JOHNSTON, in North Carolina, and with their combined forces attempt the overthrow of SHERMAN before GRANT could come up?

Whatever his plans, he doubtless little understood the ceaseless vigilance and the untiring energy of his pursuers.

I suppose it was in anticipation of the attempted junction of LEE's and JOHNSTON's armies that it was thought that our division could do some more effective work on the railroad running from Richmond through western North Carolina. After a day of needed rest, which

was well employed in picking up fresh horses, the command moved in that direction. PALMER's brigade was ordered to concentrate at Martinsville or Henry Court House, as it is called. The Tenth Michigan was then in the beautiful valley of the Roanoke near Salem, about seventy-five miles from Henry Court House. We were ordered to be at the latter place by 9 o'clock on a certain morning and there await the arrival of the remainder of the brigade. To be sure to be on time, we made the distance in twenty-six hours, and reached Henry Court House about 6 o'clock in the morning to find it occupied by a superior force of the enemy's cavalry under Colonel WHEELER.

I do not know that I ever found the time when it was exactly pleasant to come unexpectedly upon a superior force of the enemy, but if there is any time which is more unpleasant than another, it is in the early morning after a continuous march of twenty-four hours when men and horses are thoroughly fatigued. The fight was short but decidedly sharp, and we remained masters of the field, though not without serious loss, having one officer, Lieutenant KENYON, and four men killed, and another officer, Lieutenant FIELD, and three men seriously wounded. The enemy's loss was reported at twenty-eight killed and mortally wounded. This movement to Henry Court House had a meaning and a significance which we did not then fully appreciate, as we afterwards learned. By it the enemy was made to believe that Greensboro was our objective point, and consequently troops were withdrawn from Salisbury, and rapidly sent to the threatened point.

The enemy saw their mistake when a few days later General STONEMAN appeared before Salisbury instead of Greensboro.

The brigade being reunited at Henry Court House, we moved to Danbury and Germantown, from which latter place PALMER's brigade was sent to Salem to destroy some large factories engaged in the manufacture of clothing for the Confederate army, and thence to operate on the railroad running from Greensboro to Salisbury, while STONEMAN, with the other two brigades, crossed the Yadkin River at Shallow Ford, and started directly for Salisbury. Upon arriving at Salem, General PALMER sent the Fifteenth Pennsylvania Cavalry under Lieutenant-Colonel BETTS to strike the railway between Greensboro and Danville, and the Tenth Michigan Cavalry to destroy some bridges over Abbott's Creek between Greensboro and Salisbury, sending one battalion to High Point to make a diversion in that direction, while he remained with the remainder of the brigade at Salem.

The Fifteenth Pennsylvania met with marked success on its ex-

pedition. It broke the railroad between Greensboro and Danville as directed, and on its route surprised a South Carolina regiment of cavalry, making prisoners of its commanding officer and a large number of the men.

The battalion of the Tenth Michigan sent to High Point, under the command of Captain CUMMINGS, succeeded in capturing two railroad trains loaded with quartermaster, commissary and medical supplies, and several thousand bales of cotton belonging to the Confederate government. The value of the property destroyed by this detachment was estimated at more than three millions of dollars. The other two battalions of the Tenth, numbering not more than three hundred men, proceeded to destroy the bridges over Abbott's Creek, after accomplishing which they were to move on directly to Salisbury to coöperate with General STONEMAN. Another all night march was before us. It was desirable that the bridges should be destroyed before daylight. Consequently two companies were sent forward at a trot while the remainder of the command moved on more at leisure. All our information was to the effect that there was no force of the enemy in that vicinity. It seemed quite unnecessary, but as a matter of form, a small advance guard was sent forward, although it was confidently expected that should there be any enemy on the road, timely notice would be given by the two companies which had gone on in advance.

As day began to dawn, a blacksmith of Company "B" came up to me, and said that he had nearly run into the pickets of the enemy. I paid little attention to what he said, supposing that he had mistaken the pickets of the two companies who were supposed to be at work at the bridge, for those of the enemy. Not long afterwards a young officer, Captain DUNN, riding by my side, called my attention to a covered wagon which had turned into the road, and at once disappeared around a curve in it. At my request he galloped on and overhauled the wagon which was found to contain two Confederate officers. They informed me that a large force of Confederate cavalry was encamped some distance ahead on the road. I paid slight heed to this, as I thought they were trying to tell a startling story, and I could not understand how such a force could escape the notice of the two companies which had gone ahead.

Turning our prisoners over to the officer of the day, we resumed our march, but had not gone far when I observed that the little advance guard had halted. Galloping up to learn the cause of the halt, I was informed that a large force of the enemy was encamped a short distance ahead, apparently unaware of our approach.

This force was FERGUSON's brigade of WHEELER's cavalry corps, and outnumbered us about four to one. With fresh horses it would not have been difficult to make a sudden attack even against largely superior numbers, with the chances of success greatly in our favor. But with horses worn by a continuous march of twenty-four hours without rest, it seemed extremely hazardous to attack a force so largely outnumbering ours, and that force refreshed by a comfortable night's rest in camp. Then again, should we succeed in driving the enemy, it would be directly toward Salisbury, where he might augment the forces with which STONEMAN was expected soon to be engaged. On the other hand, could he be drawn after us it would increase the chances of STONEMAN's success which was beyond all things most desirable.

These considerations decided the matter, and we determined to withdraw. No sooner was the movement commenced than we were attacked with great fury. I think I may be pardoned for saying that there then followed one of the most spirited and exciting, and, in my judgment, one of the best fought minor engagements of the war. The Tenth falling back by alternate squadrons, constantly presenting an unbroken front to the enemy; wheeling out of column into line, and steadily delivering their volleys from their Spencer carbines until they could see another squadron ready to receive the shock of the enemy; then wheeling into column and falling back to a new position—officers and men, without exception, showed a courage, coolness and discipline truly gratifying to a commanding officer.

The movements were all conducted with as much precision as if the place had been but the parade ground, and the exercise but the sham fighting of the drill. The enemy attempted to pass a column by each flank, while the attacks in the rear were made with a daring and courage worthy of a better cause.

The fighting was constant and fierce, without a moment's interruption for nearly three hours, and extended over a space of about six miles, when the enemy became discouraged at his failure to surround the handful of men, and ceased his pursuit.

His loss in the engagement was afterwards ascertained to have been about seventy-five in killed and wounded, while ours was trifling.

General STONEMAN had moved on to Salisbury with two brigades. He met the enemy a few miles from town, at a little stream which had very high and precipitous banks and could not be forded. The only way to cross it was by a bridge, which was effectually commanded by the enemy's artillery. After trying for some time in vain to dislodge them by his artillery, he called to him a staff officer, Lieu-

tenant-Colonel SMITH, of the Tenth, now commander of the State troops of Michigan, and said to him: "Colonel, I want you to take twenty men armed with the Spencer carbine, cross this creek in some way, and outflank those fellows up there." SMITH took his twenty men, crossed the stream on a log out of sight of the enemy, stealthily crept up on their flank, when suddenly, with a yell, he poured a murderous volley into their ranks. The effect was remarkable. Panic stricken, the whole force broke in the greatest confusion. STACEY was on them in an instant with his Tennessee cavalry, and the fight was over. Results: Nineteen pieces of artillery, eleven hundred prisoners, and supplies enough for an army of a hundred thousand men.

A few days later we learned of the surrender of LEE's army, and for some days we were engaged in paroling prisoners. Then came the armistice, and we were ordered back to Tennessee. We made one day's march into the mountains in that direction, when we learned that the armistice had been disapproved at Washington, and we were ordered back into South Carolina to lay waste the country so that no supplies could reach General JOHNSTON's army from west or south of the Catawba River. The execution of that order was happily made unnecessary by the surrender of JOHNSTON's army.

Although the division was engaged for some weeks afterwards in the pursuit of JEFFERSON DAVIS, the capture of Salisbury terminated what I have chosen to call the "Stoneman Raid of 1865." From the beginning to the end, the expedition was managed with rare judgment and skill. While its movements were so directed as to constantly deceive the enemy as to the real point of attack, its quick and heavy blows were delivered in unexpected quarters, working immense damage to the waning hopes of the Confederacy.

LUTHER S. TROWBRIDGE,
Brevet Brigadier-General, U. S. Volunteers.

A CONFEDERATE CAVALRY OFFICER'S VIEWS ON
"AMERICAN PRACTICE AND FOREIGN THEORY."

EDITOR OF THE JOURNAL:—A few years ago the prospectus of the JOURNAL was kindly sent to me with an invitation to become a member of the U. S. Cavalry Association. Cordially endorsing its objects and the sentiments expressed, I accepted the honor as a compliment to an old Confederate cavalry officer who had served in the Army of Northern Virginia during the entire period of its existence. I have enjoyed the JOURNAL as a souvenir, finding much in it to interest an "old soldier." I have not participated in the discussions up to this time, preferring to enjoy the entertainment afforded by professional writers, to disturbing their equanimity. I find, however, that silence may be construed into acquiescence in statements that I do not concur in, and, believing that the distinguished gentlemen who differ with me, conscientiously no doubt, will be equally willing to give and take; to correct erroneous impressions, if convinced of their errors, I will take issue with the well written article by Lieutenant-Colonel E. V. SUMNER, Eighth Cavary, on "American Practice and Foreign Theory."*

I concur fully with him in regard to the practice, which he illustrates by examples furnished by the Union cavalry, but I fear he forgets that we who were on the other side, did the heaviest of the work, and yet have received little or no credit for it. Both were Americans. All that we have left was written in blood and carnage by brothers' hands; all that we hope or care to preserve is its sublime and melancholy history; its truth, its valor, its patriotic devotion to principles we were educated to believe were right.

I am an old Confederate trooper, but I know the flag of our country will never lack for men; under a proper call, the ex-Confederate soldiers and their descendants would show the same readiness to-day that their ancestors have ever shown; and the lessons taught by

*JOURNAL of June, 1890.

FORREST, HAMPTON and STUART, among the greatest of American cavalry leaders, will never be forgotten in any land where their descendants may live.

It will not be my object to detract from the glory to which any officer may be entitled, but simply to tell what I know and, if I attempt to draw a contrast it will, I hope, be considered simply an exercise of my privilege.

I recognize the text from which Colonel SUMNER makes his deductions. Soldiers are born and bred, but circumstances and opportunities do more than science, wisdom far more than learning. We had three great officers, General R. E. LEE, General ALBERT SIDNEY JOHNSTON, and GENERAL JOSEPH E. JOHNSTON. All of them were *cavalry officers*, and made the most of their cavalry. When the cavalry record is made up their "handwriting will be seen on the wall," while the "eyes and ears" will shine as beacon lights not only in the advance and in covering the retreat, but also behind impromptu breast-works of the crudest kind. The Confederate cavalry never had tools with which to make intrenchments, but relied upon fence rails, stones, dead logs and other natural obstacles; when necessary, lying as near to the ground as they could get for protection. We sometimes had a few axes, but in the four years of war I never saw a cavalryman with a spade or anything better than a shingle pulled from the roof of some house near by with which to throw up breast-works.

I will add here that the American system which General R. E. LEE inaugurated first, was transmitted to Germany by Count Colonel HORES VON BORCKE, Confederate cavalry, (of General J. E. B. STUART's staff) who was disabled by a wound at Upperville, Virginia, June 18, 1863, and returned to his native land, which he no sooner reached, than the Crown Prince sent for him, and after having heard from Colonel VON BORCKE a description of the methods and usages of the Confederate cavalry, the Crown Prince assembled his cavalry officers of rank, and they had an opportunity of hearing all that VON BORCKE had seen and learned. *This system of ours* was at once engrafted on that used by the German cavalry and was employed in the Franco-Prussian War of 1871, as VON BORCKE personally informed me, upon his return to Virginia a few years ago.

But to return to my subject: On page 146, CAVALRY JOURNAL, Colonel SUMNER says: "The records of the Cavalry Corps of the Army of the Potomac, presents to the world lessons in cavalry fighting unsurpassed in any other service, (Note: May I add, except the Confederate cavalry whom they were fighting) fighting as it did

against infantry, cavalry or artillery, mounted and dismounted, through the snow and mud of winter, in the heat and dust of summer, in advance or in the rear, in building bridges or running trains, or in burning bridges and destroying railroads, telegraphs and canals, in supplying themselves when there was anything in the country, or cheerfully going without when there was nothing to be had—its counterpart is unknown."

This is only one side of the picture; let us turn to the other. Think of the Confederate soldier environed by 2,800,000 men-at-arms against 600,000, cut off from the outer world except for the assistance of a few blockade-running vessels, the soldiers poorly fed, first on one-half, then on one-fourth rations, thousands often without shoes, without medicines and often almost without clothing, without any other money than what was manufactured on paper and that redeemable only "after they had won their independence." Think of men being paid eleven dollars per month, in Confederate money, for four years, for the use of the cavalry horse which each private soldier furnished and hired to the government, and that this was the best our poor country could do. Remember that before the war ended a cavalry horse sold for from one hundred and fifty to three thousand dollars, and, although the government tried to do justice by advancing the assessed valuation of horses mustered into the service, they paid only for those that had been killed or permanently disabled in battle; and in no case was the price allowed sufficient to replace the horse killed, for the prices of horses constantly advanced in proportion as the demand for them increased. Each private soldier had to take care of the horse which he hired to the government, and, in case the soldier was disabled, unless some friend looked after the riderless horse, the chances were that he would fall a victim to starvation and want of care, or become a total loss to the owner. If the horse was only slightly wounded or disabled, it had to be sent home, and that involved the rider's leading his sorry jade from the point where his regiment might be stationed to his home—not unfrequently a hundred miles or more, at his own expense. Many Confederate troopers mortgaged their land to pay for horses for the army. Later in the war, General MEIGS said: "The Confederate cavalry are our best customers; they are either stealing or taking our horses by thousands, for they are not accounted for." As a matter of fact, our men saw that their only chance of supplying themselves with horses lay in getting them from the other side, and instead of getting permission to go home, they were allowed to scout, and if a stray picket or straggler could be captured, it was done. Sometimes, of course, it happened

that the parties in search of horses were themselves captured,* and the game did not prove to be so profitable or satisfactory. Time and space will not admit of my going into details, but the hardships of the Union cavalry were mere sport as compared to those suffered in the Confederate service. The one represented the most powerful nation on the globe, its ports open to the world; the other with nothing but its brains, its grit, its determination to do or die in the attempt, if need be.

Many a good cavalryman furnished two, and often as many as four horses during the year. Many a fellow with his last horse, and all his money gone, had to ride his lame, tenderfooted, shoeless horse to death on a macadamized pike, bearing dispatches of which he knew the importance, and thousands of them fell at the heads of columns and were left there to die, without hope of recognition or reward, who had given up wife, children and friends and plenty at home, to serve in the ranks. But this should not be forgotten: When the war ended, there was not a first-class cavalryman in our service who was not fully equipped with saber, pistol, carbine and horse equipments, all of which had been issued by "UNCLE SAM." Necessity and the American practice prescribed that we should live off the enemy if we could.

I have, in a blunt way, stated facts, and am sure that they are what is wanted.

Colonel SUMNER makes a fling at General MEADE, who was using the Union cavalry at Spottsylvania, 8th of May, 1864, in one way, while *we* were conducting the American Practice in another. There FITZ LEE's division held two divisions of Union cavalry until relief came with General ANDERSON, who was commanding LONGSTREET's corps. Colonel SUMNER says (page 147): "The cavalry corps, pulling itself together after four days' fighting on foot in the Wilderness, was truly glad to get out." I confess I should have preferred to have them remain, for we held our own until WARREN's corps came to the relief of the Union cavalry, and pushed us back. No infantry had come to assist us, until the Fifth Corps drove us back on ANDERSON's advancing troops. We were fortified behind dead pine logs, which took fire and smoked us out the next day.

General SHERIDAN made his first raid, which was a success, his troops having been mounted on fresh horses at the opening of the campaign, while our horses, like those described by General POPE in his report on the second Manassas battle, "were worn down, starved

*Mr. LINCOLN said: "The horse question was a serious one. He could make an officer with the dash of a pen, but horses cost money, and were hard to keep."

out and in poor condition generally." The Cavalry Corps Army of the Potomac numbered about 12,000, and that of the Army of Northern Virginia about 8,000 men, (pages 14 and 17, "Virginia Campaigns").

In General STUART's efforts to intervene between SHERIDAN and Richmond, he had divided his command, having only three brigades, and SHERIDAN took it in detail with his concentrated forces. The death of General STUART was by no means called for, as the troops would have done just as good fighting without his leading as they were doing when he fell. His untimely loss only proved that his hands were less valuable than his head and eyes. Any good captain in his command could have done all the work that he did when he lost his life in a vain effort to keep back the greatly superior forces he was contending against. This was a heavy loss for us and scored one for SHERIDAN, whose prestige started in this very unequal contest.

Now turn back to page 146, where Colonel SUMNER says, that "SHERIDAN, who had all the theory there was about it in his own head—with MERRITT, GREGG, WILSON, DEVINS, GIBBS, DAVIES, IRVIN GREGG, CHAPMAN and MCINTOSH commanding divisions and brigades, this body of horsemen was never defeated." I have watched the careers of this galaxy of distinguished officers with interest, and have felt their blows, but let us see: General SHERIDAN, with his cavalry corps, was sent by General GRANT to join General DAVID HUNTER who was moving up the Shenandoah Valley, destined to Lynchburg. Why did he not join him? Because of the American practice of General LEE, who sent General HAMPTON, with one-half of SHERIDAN's numbers, to attack and detain him. HAMPTON, on the 11th of June, 1864, with his tattered divisions, lay across his path at Trevillian's Station, and with that gallant handful in SHERIDAN's front, and our division (FITZ LEE's) on the Louisa Court House road, stopped him the first day, and on the second day defeated him and drove him back, his dead and wounded being left in HAMPTON's hands. In his report General SHERIDAN says that PICKETT's infantry (they were FITZ LEE's dismounted cavalry) came from the direction of Gordonsville, and the want of ammunition determined him to return to the army on the James River, having accomplished his mission.

It may not be pleasant to acknowledge defeat, but had General SHERIDAN been able to carry out his orders, General LEE could not have maintained his position at Petersburg another day, with HUNTER and SHERIDAN holding Lynchburg, and the railroads in his rear destroyed, as it was intended by GRANT's order that they should be, by SHERIDAN. Here the American Practice was fully executed from

dire necessity, and though it cost us dearly for the splendid victory. HAMPTON was made a lieutenant-general as a reward of merit; and the fight itself has been regarded by Confederates as the proudest achievement of their cavalry during the war.

The case was illustrated as well by General JOHN BUFORD's First Division of U. S. Cavalry at Gettysburg; and nowhere better than by my brigade at Winchester, (September 19, 1864,) when we covered General EARLY's rear, and where General SHERIDAN failed to capture EARLY's army, though he had ten thousand cavalry, three corps of infantry, and one hundred pieces of artillery on the field. General EARLY's army, consisting of only fourteen thousand troops of all arms, escaped, and that in an open country. The *escape* of the Confederates was a decided victory for them.

The American practice was exemplified the next day or two afterwards at Front Royal and at Milford, where my little command, Second Cavalry Brigade, Army Northern Virginia, with less than fifteen hundred men, held at bay two divisions which ought, by all means, to have run over us, and could have done so with some slight losses, and by that means could have gained EARLY's rear, through the mountain gap at Newmarket, to which place General TORBERT was ordered and marched his command after we had retreated from Milford; but by that time EARLY's army had passed on unmolested. The first decided advantage of the Cavalry Corps of the Army of the Potomac, was its surprise of General STUART at Brandy Station (Beverly Ford) June 9, 1863. The plan was well formed by General HOOKER and as well executed by General PLEASANTON, and the records show that the object of the expedition was accomplished. From that time its organization and concentration made it conscious of its own strength.

When General SHERIDAN turned upon ROSSER in the Shenandoah Valley, at Tom's Brook, October 9, 1864, his success there did more to cripple our cavalry than any other thing that had ever happened. We lost our wagons and artillery; and all the accumulated comforts we had captured in years were swept away in that disaster; winter coming on, they could not be replaced. We had our ups and downs, but the battle of Dinwiddie Court House and the next day's fighting, April 1, 1865, showed that our thinned ranks were as ready to meet SHERIDAN as they had ever been before. At Five Forks, had General SHERIDAN cared less for WARREN's movements, and handled his cavalry more skillfully, not one of us would have been left to support our banner. WARREN had seventeen thousand infantry, SHERIDAN thirteen thousand cavalry, and we, about eight thousand men, all

told, yet he did not capture over one-half, although the Confederates were without a commander on the field until after the battle.

Having now given my views, I am free to say that I believe the American cavalry, equipped with a magazine carbine, revolver and saber, and assisted by good horse artillery, are capable of performing any duty, of marching any where and protecting themselves against troops of any kind whatsoever, of one-third greater numbers, it matters not where they are from, *if the opponents are dismounted*. I estimate the value of the good cavalry horse at one-third more than that of men, when the men are horsemen and accustomed to the use of fire-arms.

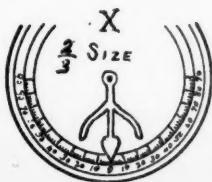
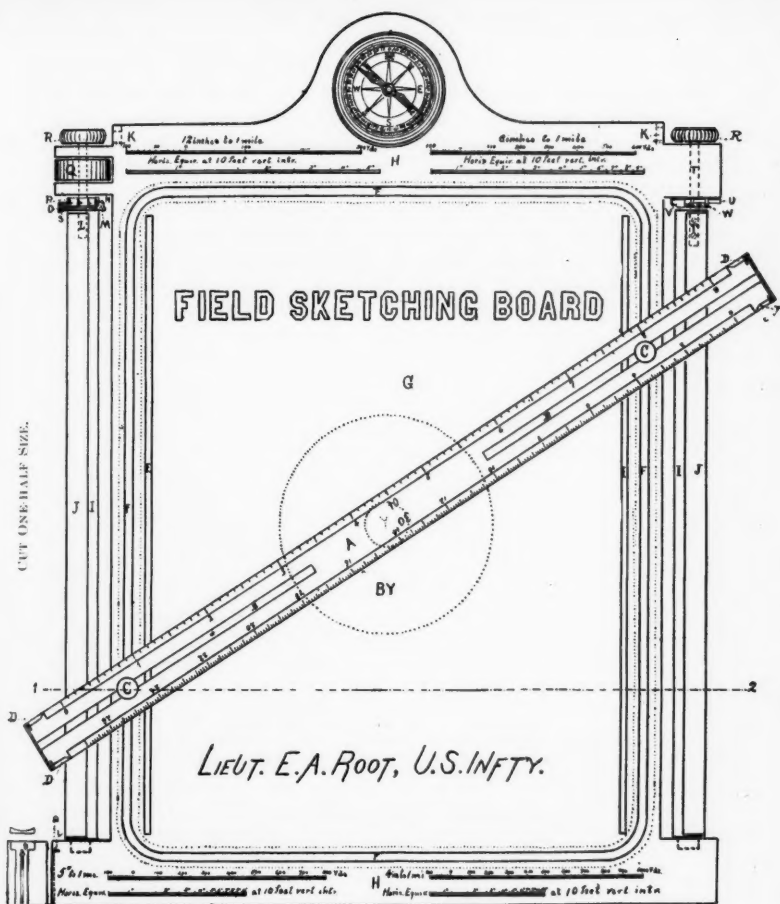
THOMAS T. MUNFORD,
Lynchburg, Virginia.

PROFESSIONAL NOTES.

DESCRIPTION OF "FIELD SKETCHING BOARD."

The board proper may consist of a single casting of some light material (as aluminum) having the two slots EE cut entirely through, and the groove F running around the edge. The casting to be as thin as possible in all parts, consistent with strength and durability, to reduce its weight to a minimum, or the board may be made of wood having a rim of metal inlaid to form the upper part of the groove F. On the bottom of the casting, in the center, is the wrist-plate Y, on to which a strap Z may be screwed for fastening the board on to the wrist when used on horse-back, or the board may be screwed on to a tripod when desired to use it as a plane table.

On the left side of the board is the roller I to which is fastened on the upper end the face-plate M. To this face-plate is attached the ratchet dog N and the release O. On the perimeter of the face-plate is a notch S, into which the release drops to hold the dog away from the ratchet wheel. The spindle L passes through and has fastened to it a milled head R, a spiral spring Q and the ratchet wheel P. On this spindle the roller is free to revolve. On the right side is a roller I into the upper end of which is fastened the spindle T with a milled head on the outer end. On this spindle is also fastened the ratchet wheel W. To the casting is attached the ratchet dog V and the release U. On each of the rollers is a spring J, between which and the roller the end of the strip of paper is inserted to hold it fast. "a" is a spring for holding the paper when putting it on the board to keep it from uncoiling. In the head of the board a compass is sunken, but with the case free to be revolved entirely around. On the back of the board behind the compass is placed a clinometer shown in X. K and K are two sights to be turned down for use with the clinometer. The ruler A of suitable material, is fastened on top of the board by the two buttons CC which work in the slots BB in the ruler, and the groove F in the board. On the edges of the ruler at the ends are sights DDDD which can be raised like knife blades for use. On the board and ruler as represented, the most useful scales could be stamped. The size of the board represented was chosen with particular reference to the use of paper prepared and drawings made in accordance with paragraphs 541 to 553 A. R., 1889.



To prepare the field sketching board for use, a strip of paper six or seven inches wide and two to three feet long is first wound on the left roller and extended over the board to the right roller. To do this place the ruler about parallel to the rollers over the center of the board, release the dog N from the ratchet wheel P, lay the paper from the right side across the top of the board, insert the left end under the spring J, (as shown in section) then wind up the paper by turning the roller towards the board until all but about eight inches has been wound. *Pass the free end of the paper over the roller to the left*, then holding it on the roller to prevent its uncoiling, by means of the spring "a" raise the release, pass the paper under the roller, up through the left slot E over the top of board under ruler, down through right slot E under right roller, up over and under the spring J, (as shown by the red line in the section) one full turn of the paper being taken around the roller to hold spring down firmly. Any slack in the paper is afterwards taken up on the left roller by winding up the spring Q, turning the milled head to the right. The spring Q and ratchet arrangements on the rollers enable one to keep any desired tension on their paper, and always ensuring its lying firmly on the face of the board. A few turns of the paper can be wound from the left on to the right roller by simply turning the latter, the spring Q permitting this to be done. To bring fresh paper on the board release the dog N and turn the right roller until as much has been drawn out as desired, then throw the dog back into the ratchet. To remove the paper from the board after finishing the drawing release both dogs from the ratchets and withdraw the paper.

Extract from RICHARDS' *Topograph* 1:

"The compass box has a small projection at the north end of the meridian line by which it is turned around to coincide with the direction of the needle, in order that the meridian line may be placed in such a relation to the sketch that the road, river, etc., will occupy its center. To do this, strap the board on left wrist and hold it so that the length of the strip of paper may correspond with the general direction of the road, the left side of board to the front. Revolve the compass box until the north end of meridian line corresponds with north end of needle. Draw a meridian line on the sketch, parallel to that in the compass box, and mark the north end. Care must now be taken that the position of the compass box shall remain unaltered during the sketch, unless it becomes necessary to change the general direction.

"To draw the direction of the road or of any object turn the horse exactly in the direction of the object, revolve the board on the wrist until the meridian line corresponds with needle, the board being level when any direction is drawn: by moving the arm to the right or left bring the point from which the line is to be drawn on the sketch in front of the center of the body. Now turn the ruler in the required direction, its edge corresponding with this point, and draw the line; just before doing this glance at the meridian line to see that it coincides with the needle, and that the latter does not touch

the box. A slight alteration of the board is now better effected by moving the arm than by revolving the board on the wrist.

"Should the road change its general direction at any point so as to run off of the board, a line should be drawn across the paper at this point, and the sketch recommenced. The meridian line in compass box is now altered, as on commencing the sketch, to suit the new direction, and is drawn on this portion of the sketch.

"The new starting point is taken in the center of the sheet and two or three inches above the line. These alterations of meridians may have to be made several times. When the sketch is finished it is removed from the sketching board, cut across the line where the meridian was changed, the points where the sketch was discontinued and recommenced are made to coincide by a pin driven through them into a table, the pieces are then turned so as to bring their meridian lines parallel and firmly pinned in this position both are cut through at one cut of a sharp knife. The pieces are then joined by a strip of paper pasted on the back."

The particular claims of superiority of this sketching board over all others made either in the United States or Europe, are the universal motion obtained for the ruler by the method adopted, together with the fact that the ruler is always on the board when wanted, and cannot drop off, which is a very important factor when sketching on horseback. There is no resort to uncertain rubber bands for holding the ruler, rollers and paper, as have to be done with the most improved styles at present in use. When desired to obtain greater accuracy, or to use it as a plane table, the sights on the ruler coinciding with the drawing edges are a great advantage. Other important points of superiority are the means provided for always keeping control of the paper when adjusting it on the board, and until it is ready to be removed. None of the vexations encountered when trying to use other sketching cases or boards are here met. Every point of difficulty in such work has been carefully considered and studied, for the purpose of devising some means of overcoming it, and it is believed that this sketching board does so to a greater extent than any other, and that it possesses about everything to be desired for rapid field work, and with an accuracy as great as can be expected. In view of the great importance attached to the facilities for making rapid field sketches and reconnaissance maps of roads, rivers and positions, and in view of the influence that such maps and sketches will have upon future military operations and battles, the providing of a suitable sketching board to be used in such work is necessary.

E. A. ROOT,

First Lieutenant, Nineteenth U. S. Infantry.

THE WOUNDS CAUSED BY SMALL CALIBER BULLETS.

Translated from the *Revue du Cercle Militaire*, Nos. 18 and 19, of 1891, by Lieutenant R. H. WILSON, Eighth U. S. Infantry.

For a number of years past nations have evinced a most gratifying tendency to render war more humane and less sanguinary. Inventors of engines of destruction for the use of man in warfare seem to have in view the object of disabling the greatest number of combatants in the shortest possible space of time, but without necessitating the infliction of the terrible wounds which were one of the most prominent and distressing features of war in the past.

This idea has been predominant in all the changes which have been effected in modern armament, and to this is also due the fact that weapons more in accordance with the sentiments of civilization have replaced the old fire-arms, the aim of which was so uncertain, and the horrible wounds resulting from which were almost always necessarily fatal.

In addition to the immense influence which the new arms have had upon tactics, they have also attracted the attention of surgeons, and their effects have formed the subject of long and minute studies, the results of which are to be found in numerous publications which have recently appeared. Among the most interesting of these may be mentioned: In France, those of CHAUVÉL and DELORME, and others by CHAVASSE and NIMIER.

A work of very recent date by Dr. BRUNS, a German, who has made a conscientious study of this subject, has thrown a new light upon it, and has also given rise to numerous comparisons of his ideas with those of the French surgeons. Dr. BRUNS has devoted his study exclusively to the Mauser rifle, while the effects of the Lebel form the subject of a very minute investigation made by Dr. NOEL, and published by him in the *Medical Bulletin*, of February 25 and March 5, 1891.

Before entering into the active discussion of the question, it will be not without interest to describe the wounds formerly produced by the leaden bullets of the large caliber fire-arms used by European armies. These bullets, at first round, then cylindro-conical and ogival, were of enormous weight: some of them weighed as much as 740 grains, and rendered necessary the employment of such calibers as .68 and .72 (the Minié carbine). The bullet of the Chassepot rifle, caliber .43, which was really a notable step in advance, still weighed 385 grains, while that used by the Germans in the war of 1870-71, weighed 478 grains. In consequence of the malleability of the metal of which they were made, these bullets were expansive, that is they easily lost their regular form; at the short ranges they mushroomed readily and burst into fragments upon the least contact with a hard body. The result was that wounds were sinuous and irregular, their edges were more or less lacerated, and the apertures of entrance and exit were of very disproportionate size. Frequently the latter was three or four times larger than the former. Moreover these bullets often left in the wound, besides fragments of clothing,

splinters and fragments of lead, which, by their presence in the various parts of the body, induced long and obstinate suppurations, frequently rendering secondary operations necessary. Wounds of the blood vessels were naturally more frequent, as they were more exposed to risk of laceration, and hemorrhage—the greatest danger of all on the battle-field—was always grave. Bones were likewise often struck and, if the contact was direct, they were shattered, and numerous splinters added new complications to the wound. Such were the causes of the horrible wounds which, according to Dr. BRUNS made such a profound impression on PIROGOFF during the Crimean War.

Every one is familiar with the grave prognosis of the wounds caused by the fire-arms of that period, and the knowledge of their murderous effects is the principal cause of the sentiment of relief and gratitude which has greeted the advent of arms of small caliber. It was not until 1866 that these new arms made their appearance, in the adoption by France of the Chassepot rifle (caliber .43) weight of bullet, 385 grains. It was displaced by the Gras, model of 1874, caliber .43, weight of bullet 385 grains, and this in turn by the present rifle, the Lebel, the caliber of which is .315, and the weight of bullet 231 grains. In Austria the Mannlicher has been adopted, while the Germans use the Mauser, caliber .311. Portugal, Switzerland and Belgium have also taken steps in this direction and have indicated their predilection for arms more or less similar to those described. The principle characteristics of the Lebel rifle are its reduced caliber and its great power. Its use necessitates the employment of a special slow burning powder; it is a magazine rifle of comparatively light weight, the bullet of which is composed of a hard metal, lead and antimony, covered with a protecting envelope of nickel. This envelope is closely united to the body of the bullet, and only in exceptional cases, do the two become separated. Its weight, as has been said, is 231 grains, and it has an initial velocity of 2067 feet. Its trajectory is very flat, and its zone of effect extends to a distance of from 3280 to 3500 yards. By virtue of its immense velocity both of rotation and translation, its penetrative force is very great. Following are some examples of its penetration in various substances and at various distances:

At 218 yards the penetration in oak was.....	10. inches.
At 218 yards the penetration in pine was	24. inches.
At 218 yards the penetration in sheet iron was.....	.24 inches.
At 547 yards the penetration in oak was.....	6. inches.
At 547 yards the penetration in pine was.....	20. inches.
At 547 yards the penetration in sheet iron was.....	.16 inches.

These few examples give the means of forming an idea of the effects of bullets of such penetrative power on the human body. These effects must be considered at different points of the trajectory, and for this reason, authors have recognized three distinct zones of action:

First, a zone of explosion; second, a zone of penetration; third, a zone of contusion.

It is evident that these three zones do not appertain exclusively to arms of small caliber; they may also be studied with arms of the old models. The only difference existing between them is in their extent, resulting from the greater range of the new arms. Thus, in the case of the Gras rifle, model of 1874, the zone of explosion does not extend beyond 120 yards; but in that of the Lebel to 330 yards. In like manner for the Gras, the zone of penetration is comprised between 330 and 1100 yards; for the Lebel extends to 3300 yards. The zone of contusion for the Gras ceases at 1950 yards; the effects of these three different arms will not vary appreciably within the zone of explosion, and according to DELORME and CHAVASSE, all wounds in the space between 330 and 900 yards are about equally dangerous. CHAUVEL, while generally sharing their views, admits however, that explosive effects are of much less frequent occurrence in the case of arms of small caliber. As Dr. NOEL has well expressed it, the wounds produced by the explosive action of bullets are of the gravest character. "The disorganization of the soft parts is so extensive and the loss of tissue so considerable, that in general all repair is impossible and a considerable sacrifice is rendered unavoidable." Only in very exceptional cases and only near the boundary of the zone of penetration, can the surgeon hope to save a limb which has been struck.

Bones are almost always crushed and splintered, the blood vessels lacerated, and the nerve centers receive a profound shock. This complication renders the prognosis so much the more likely to be serious. Therefore it cannot be claimed that for short ranges the employment of the Lebel is a step in advance, except from a tactical point of view. In the zone of penetration the appearance of things is changed; for, while with arms of large caliber the wounds were of comparatively great size, on account of the ball breaking into fragments, and the mushroom shape which it often assumed—a shape which had the effect of violently throwing the fluids of the body from the path of the bullet towards the surface—with the new arms the course of the bullet in passing through the human body is almost always rectilinear, and the two orifices are about equal in size. The edges of the wound, moreover, are neither lacerated nor bruised; it has almost always the appearance of a simple furrow. The skin once pierced, the bullet passes directly through and traverses the tissues without stopping. On account of its density it does not change its form, and seldom carries with it pieces of clothing. As it does not burst into fragments, foreign bodies are not generally present in the wound, and, therefore, suppuration and consequent abscesses are not to be feared. Reunion is ordinarily by first intention, and if the healing process does not take place equally throughout the path of the bullet, it will be the result of the presence of small fragments of clothing already alluded to, and which it will always be impossible to entirely exclude from the wound. In any case, the period of recovery will be greatly abbreviated, and extensive shock or paralysis of the member will be of comparatively rare occurrence. Gangrene will less often result, and will never be of the grave nature frequently

encountered at present. The new conditions will also result in diminishing the serious features of injuries to bones, and direct shocks will be less frequent. They will rather receive tangential blows and consequently the comminution will be diminished. Fissures and splinters will always result from a bone being hit, but the splinters will be smaller and not carried so far. Moreover, the bone will often be pierced through and through and fewer fragments will find their way into the medullary cavity. Proportionally to the diminished diameter of the bullets, blood vessels and nerves will be more rarely struck, and, in the event of such occurrences, the injuries will be definite, precise and without the former serious features. The liability of hemorrhage will be diminished, and the wounded will be so much the more able to await the arrival of assistance. What has just been said applies to wounds produced by bullets fired at ranges from 875 to 1,300 yards; at ranges greater than this last named distance it would seem that the .315 bullet is more destructive in its effects. According to certain investigators they are even greater than those of the .43 caliber, but no satisfactory explanation of this fact has as yet been offered.

The same observations are applicable to short bones, the perforation of which by the small caliber bullet is much less funnel shaped than that of the .43 bullet, and is attended with less splintering, and also to flat bones, which are almost always perforated in the cleanest and most sharply defined manner. An interesting property of these last is that they are more sensible to the effects of hydraulic pressure than long bones. This in itself is of little importance, however, as when a flat bone is perforated, its injury is only of an accessory nature, that of the subjacent organs almost always determining the prognosis. Hence, the general result is that the wounds caused by the .315 bullet are much less serious than those of the former caliber. This holds true of shots fired at equal ranges, and is even more apparent if the effects of bullets of equal velocity are compared.

This fact results directly from the experiments of NIMIER and CHAVEL, as published in the *Archives de Medecine et Pharmacie Militaires*. The advantage is entirely with the .315 rifle, and therefore it cannot be denied that it forms a step in advance, since it permits a hope of saving limbs which formerly would have been necessarily sacrificed. The simple nature of wounds, the certainty that the bullet has passed through, the absence of contusion of the edges of the wound, will preclude unnecessary probing and examination, and will also facilitate the application of a simple antiseptic dressing which will permit the wounded to be transported to a central point where they can receive the necessary medical attention. The wounds which will be encountered in the zone of contusion will be either simple contusions or contused wounds. In this zone the wounds mentioned in speaking of bullets remaining in the tissues, will be met with. These wounds have nothing very remarkable in their nature. It is evident that their gravity will diminish in proportion as the bullet has approached the end of the trajectory, and has therefore lost its force. Occasionally, however, a bone being struck, inflammation of

the periosteum will result, leading to abscesses and exfoliations. But these will be the most serious cases, and for the most part there will result merely extravasations of blood into the areolar tissues, which can be readily cured without risk of gangrene of the parts affected.

From what has been said, then, it may be concluded that the Lebel from a surgical point of view, has many points of superiority over arms hitherto used, and that in many cases, the wounds caused by it may be likened to those of the revolver, the bullets of which, of small caliber also, may, without much danger, be allowed to remain for some time in the wound. (CHAUVEL).

The experiments of Dr. BRUNS in Germany were made, not with the German rifle, model of 1888, but with the Mauser rifle which was adopted by the Belgian army on October 23, 1889, as compared with the old German rifle, model of 1871-1884.

The German rifle of 1888 has a caliber of .304; it has four grooves, and its bullet, which weighs 224 grains, is composed of a steel envelope coated with German silver, into which a core of hardened lead is compressed. The Mauser rifle, used by the Belgian army, is of slightly smaller caliber than that of the French army, viz, .301; it has four grooves, and throws a bullet weighing 216 grains. This bullet is formed of a core of soft lead covered with a steel envelope, which is coated with German silver. The charge is composed of a special powder, giving, at eighty feet from the muzzle, a velocity of 2,035 feet, and a motion of rotation of 2,500 revolutions per second. The resemblance between these two arms is so close that the observations of Dr. BRUNS on the Belgian rifle may be considered equally applicable to the German. Although the experiments of Dr. BRUNS were made at very short range—forty feet—it is evident that the penetration of the bullet is very great. As compared with that of the model of 1871-84 it is six fold greater. Making use of these data, Dr. BRUNS, by a method of procedure analogous to that of the French surgeons, has studied the destructive effects of the Mauser rifle at different points of the trajectory of its bullet. He divides this space into four distinct zones:

1. Zone of explosion, in which the living force is very great—from 435 to 545 yards.
2. Zone in which the living force is great. It extends to 1,080 yards.
3. Zone of living force, extending to 1,650 yards.
4. Zone of spent force, extending to 2,175 yards.

These four zones correspond approximately to the three French zones, the second and third being consolidated into one. In shots fired at short ranges the explosive force is less, but that of penetration is much greater. For this reason fractures of bones struck by its bullet are one-half less in extent than those of the rifle of 1871-84, while, on the other hand, the bullet will pass entirely through several limbs placed one behind the other. In case of fracture the fragments adhere to the periosteum, while the soft parts are cut out as if by a punch. The orifices of entrance and exit are of unequal size, but

the inequality is not so marked as in the case of the old rifle. As with the Lebel, the perforation made by the bullet in passing through muscles is often contracted and reduced to a minimum. The bullet quite frequently loses its regular form; out of fifty-nine shots fired, in but seventeen was the bullet found unchanged, and in eleven the head was slightly flattened. In the remainder the envelope was more or less detached from the core, and torn to some extent.

From this point of view the bullet of the Belgian arm seems to be inferior to that of the Lebel, although infinitely superior to its predecessors. At long ranges the gravity of the wounds of the Mauser rifle seems to be less; the wound, as in the case of the Lebel, assumes the nature of a subcutaneous wound; in other words it will heal without suppurating. Fractures of bones are clean and free from fissures; neither are fragments forced into the medullary canal or into the surrounding tissues. These features render the prognosis more favorable, and, according to Dr. BRUNS, it is not attended with the unfavorable tendencies noticed by the French surgeons in the case of wounds at ranges greater than 1,300 yards. His observation on wounds of the blood vessels and nerves present no new facts; they serve only to confirm those already known.

In conclusion, although everyone will not share the optimistic views of Dr. BRUNS, who regards the Belgian Mauser rifle as the ideal weapon, regarding it from a humane standpoint, it may be affirmed from what has been said, that the introduction of arms of small caliber is an important step in the art of war. The task of the surgeon, rendered more onerous on the one side, has been lightened on the other, and perhaps it has also been made more attractive by the hope of more cases of wounds successfully treated.

BOOK NOTICES AND EXCHANGES.

THE TRIALS OF A STAFF OFFICER. By Captain Charles King, U. S. Army.

This is a handsome little volume, made up of papers published at different times in Hammersly's *United Service Magazine*, now collected in permanent form for preservation. We risk nothing in saying that the book shelves of our army officers, laden as many of them are, with biographies and campaigns of the great army commanders of all countries and all times, will hold nothing of more real value, in many respects, to the officers who have lately arrived and are now entering the military service, than this series of sketches of the duties performed by the subalterns of some twenty years ago. They possess all the charm of truthful description and literary style which have made the author what he is generally admitted to be—by unprejudiced and unbiased officers of the army—the real painter of life as seen and lived by our officers on the frontier, when coming railroads were regarded as the dreams of a visionary, and the noble red man, anticipating the great Cook and his tourist schemes, “personally conducted” nearly the whole effective force of the army through three-fourths of the territory of the United States in the course of a summer.

Under the trained hand of the literary artist the picture has been made to assume, with a perspective of nearly half an ordinary life time, a humorous side, plainly apparent now, but which had no existence then. Those were days when, in the school of experience, no task or number of duties were regarded as beyond the province of the youngest officer to tackle, whatever the result might be. Without clerical assistance, with the most meager facilities for performing office work, he was liable to have thrust upon him the duties of two or three of the supply departments, and permitted to work out his own salvation; and that with little or no sympathy from his seniors, most of whom had previously traveled the same rough and rocky road, whose scattered mile-stones were supposed to lead to a final “settlement” somewhere, but really bore only such inscriptions as “stoppage of pay,” or other legends of an equally reassuring kind.

It is seldom that one class of people can suffer without being the source of amusement to others. In this case the only persons who

derived any real enjoyment from a contemplation of the perplexities and misfortunes of the overworked subalterns were the "de jure" officers of the different staff departments. Enconced in fine offices in some large city, surrounded by a host of high-salaried clerks, with "little to do and plenty to get," they realized Sam Weller's idea of a good thing; and to show their appreciation of it devoted themselves assiduously to the task of filling the empty pigeon holes of their rose-wood desks with a choice collection of papers wrung from the hands of an Acting Quartermaster who, far from having any aspirations towards literary fame, would have willingly foregone all hopes of that kind for an invitation to a dinner of bacon and beans with the packers of the command with which he was making his usual summer tour after Indians. It was easier to call for a new return than to take the one of the previous month from the pigeon hole in which it served as a propagating medium for microbes and bacteria; and, besides it was necessary, for decency's sake to keep up a semblance of employing the office force.

Away off in the dim distance—so far off that, although all had sorrowfully heard of it as something that like death must be encountered some time—but few had ever seen it—was the Treasury Department, with its auditors and comptrollers who, when the officers of the Staff Departments grew weary of persecuting and took a rest, turned loose upon the defenseless subaltern with Statements of Differences, in which he was generally charged, each time, with all the property which had ever been issued to him, or any one of a similar name, since his first entry into the service. If this were accompanied, as it frequently was, by a letter bearing the signature of the Chief Clerk of the War Department, who did not neglect to enclose, simply as a matter of courtesy, a quotation from the Revised Statutes, intimating that the delinquent would, if the returns were not at once forthcoming, be considered a defaulter and be subjected to the usual penalty, a fine of five thousand dollars or imprisonment in the penitentiary, or both—the subaltern's cup was filled to overflowing—and so was he apt to be, if the wherewithal could be obtained.

In spite of all this red tape and annoyance, not by reason of it, the property of the government entrusted to the care of its army officers has generally been accounted for with scrupulous care and fidelity, and settlement of the accounts concerning it been ultimately obtained, after the usual expenditure of the time and stationery deemed necessary to satisfy all parties charged with their final examination.

"What has been, will be again," and therefore we recommend to the young officers who, for want of experience in the rough school of the frontier, are beginning to find fault with the conditions of life as found in our large garrisons, a careful and thorough study of the sketches entitled respectively "The Adjutant" and "The Ordnance Officer;" for so surely as we have another great war or insurrection on our hands, the drudgery of issuing stores and the exasperating system of accountability for government property, will be again thrust

upon the subalterns of the line under conditions closely resembling those so vividly described in the sketches named. The experience of their predecessors may enable them to avoid, or surmount with greater ease, the difficulties they are certain to encounter. *b.b.b. bar*

HISTORY OF THE FIRST MAINE CAVALRY. By Lieutenant Edward P. Tobie, formerly an Officer of the Regiment.

This is a book of 755 printed pages, bound in morocco, with sixty-nine pages of illustrations, comprising 307 portraits of members of the regiment and scenes of camp and field, with representations of the uniforms, arms and equipments, as they appeared in the days of the war. Price, \$5.00. Address, J. P. Cilley, Treasurer First Maine Cavalry Association, Rockland, Maine. *b.b.b. bar*

THE "BATTLE ORDER" OF THE ARMY OF THE POTOMAC.

General Orders No. 110, Headquarters Army of the Potomac, March 7, 1865. This order contains the names of two hundred and sixty-three regiments, and the names of battles which each regiment is entitled to bear on its colors. The original order was never circulated in any wider manner than through the regular army channels, and hence, is entirely out of print. Price, ten cents per copy, or twenty copies for one dollar. Address J. P. Cilley, Treasurer First Maine Cavalry Association, Rockland, Maine. *lodelebar*

MILITAER WOCHENBLATT. Series of 1891.

No. 24: The War of 1806-7. The English Squadron Maneuver of 1890. No. 25: Horse-Shoeing in the Army. Cases of Typhus in the French Army in 1889 and 1890. Grand Autumn Maneuvers in France. Recruiting the English Army. No. 28: Remarks on Infantry Fire Tactics. Military Slaughter Houses in France. Experiments with Unshod Horses in France. Companies of Discipline at Guadaloupe. The Largest Cannon in France. No. 29: Estimates for the English Army. Remounts for the French Cavalry. Changes in Tactical Principles. No. 30: Suggestions as to the Attack of Large Bodies of Infantry. A New Belgian Carbine. No. 31: Suggestions as to the Attack of Large Bodies of Infantry (continued). Heligoland and the German Fleet. Demolition of a Part of the Ramparts of Belfort. No. 32: Suggestions as to the Attack of Large Bodies of Infantry (conclusion). Experiments with Smokeless Powder in Denmark. The Portsmouth of China. The Saint Marc Smokeless Powder. The Garrison of Paris. No. 33: The Question of Fortresses. Review at Nice. No. 34: Horse-Shoeing in the Army. Reply to the Article, "The English Squadron Maneuvers of 1890." Filtration of Drinking Water. Green Fodder. No. 35: Officers' Horse Races in France. New Naval Guns. No. 36: The Officers' Patrol in its Relation to the Strategical Operations of Cavalry. Programme of the Italian War Minister. Shoeing of English Horses. Increase of the French Cavalry. No. 38: New Military Field Lantern. Smokeless Powder in Switzerland. No. 39: The French Army Estimates for 1892. Health of the English Navy. Ascent of

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JOURNAL OF THE ROYAL UNITED SERVICE INSTITUTION.

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THE WESTERN SOLDIER. April and May, 1891.

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THE UNITED SERVICE. Hammersly & Co.

April, 1891: The Indian Problem. General Sherman. History of the Mormon Rebellion of 1856-57 (conclusion). The Persian Army. Old Regiments of the British Army. Admiral David Dixon Porter. The Difference between Military and Martial Law. Colonel Henry Whitney Closson, U. S. Army. May: Attack upon a Railroad Train. National Legislation required on Weights and Measures. Recent Army Legislation. The Last Victim of the Gauntlet. June: A Ride Through the Indian Territory. Legal Aspects of the Killing of General Barrundia. General William T. Sherman. Modern Practical Military Instruction. The Crossing of Columns on the March. A Western Campaign.

THE FIRST MAINE BUGLE.

Several numbers of this valuable and interesting journal, devoted to the highly honorable task of perpetuating the good name and fame of one of the grandest of our volunteer organizations, have been received. It contains, not only notices of many of the enjoyable reunions of the surviving members of the regiment but, in addition, obituary notices of many who, having "fought the good fight," have passed over to the land of perpetual peace. The *Bugle* is published four times a year by the First Maine Cavalry Association, at Rockland, Maine. As an aid to the future historians of the Civil War, it should be bound and preserved in every public library in the country.

THE REVIEW OF REVIEWS.

April, 1891: How to Fight the Tap Room. The State as Anti-christ. Another Practical Social Programme. The English Church of the Future. Girl Life in Italy. The Horrors of Cattle Ships. General Booth. A National Literature for America. May: A Socialistic View of Immortality. Will Morality Survive Religion? Iron and Steel Industries of America. How Charles the First was Beheaded. Democracy on Diamonds. Eight Hours Experience at Victoria. The Scriptures of Satan. Alas, the Poor English!

PUBLICATIONS OF THE ALDERSHOT MILITARY SOCIETY. 1890.

No. 24: "The Battlefield of Noisseville (31st August, 1870) Revisited." No. 24: "Modern Military Rifles and How to Use Them." No. 26: "Imperial Federation and the Defense of the Empire." No. 27: "Physical Geography in its Relation to Military Operations." No. 28: "The Phonograph and its Practical Applications to Military and Other Purposes." No. 29: "The Battle of Villiers-Sur-Marne on the 29th of November, 1870." No. 31: "Electricity and its Tactical Value for Military Operations."

JOURNAL OF THE MILITARY SERVICE INSTITUTION.

April, 1891 (Extra Number): Gun Making in the United States, by Captain Rogers Birnie, Ordnance Department. May, 1891: Cavalry in Virginia During the War of the Rebellion. Theory of Drift of Rifled Projectiles. Artillery Difficulties During the Next War. The Recent Indian Craze. The New German Rifle and Firing Regulations. The Red River Dam. Reprints and Translations. Military Notes. Historical Sketches of the United States Army—The Adjutant General's Department.

OUTING.

April, 1891: Composite Photography. The Wisconsin National Guard, by Captain Charles King, U. S. Army. The Athletics of Ancient Greece. With Rod and Gun in Northwestern Woods and Waters. May: Photographic Dark Rooms. The Wisconsin National Guard (concluded). Athletics at Amherst.

PROCEEDINGS OF THE ROYAL ARTILLERY INSTITUTION.

March, 1891: The R. A. Mess at Woolwich. Fire Discipline. Notes on the Equipment and Service of our Mountain Artillery. April, 1891: Imperial Federation and the Defense of the Empire. Some of the More Recent Developments and Applications of Explosives. The R. A. Mess at Woolwich.

THE IOWA HISTORICAL RECORD. April, 1891.

Austin Adams. The Address of Governor Kirkwood at the Dedication of the Monument to General N. B. Baker. Bushwhacking in Missouri. The State Teachers' Association in the Civil War. Justice Samuel F. Miller.

THE JOURNAL OF COMPARATIVE MEDICINE AND VETERINARY ARCHIVES.
April, 1891. William R. Jenkins. New York.

Meningitis. Tracheotomy and Laryngeal Injections in the Throat.
Age of the Horse, Ox, Dog, and other Domesticated Animals. Pseudo
Tuberculosis. Selections from Foreign Journals. Society Proceed-
ings.

QUARTERLY REPORT OF THE KANSAS STATE BOARD OF AGRICULTURE.
March 31, 1891. H. Mohler, Secretary, Topeka, Kansas.
Monthly report of same for April, 1891.

POSTAL SAVINGS BANKS; AN ARGUMENT IN THEIR FAVOR. By the
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